al Library

BULLETIN

OF

THE NEW YORK ACADEMY OF MEDICINE

INSTITUTED 1847

SECOND SERIES, VOL. III, No. 11

NOVEMBER, 1927

PUBLISHED MONTHLY BY
THE NEW YORK ACADEMY OF MEDICINE
LANCASTER, PA. Lime & Green Sts.
NEW YORK Fifth Ave. & 103 St.

1927

OFFICERS OF THE ACADEMY

President

SAMUEL W. LAMBERT

Vice-Presidents

FREDERICK T. VAN BEUREN, JR. CHARLES A. ELSBERG

WILLIAM H. PARK

Recording Secretary

FENWICK BEEKMAN

Treasurer

SETH M. MILLIKEN

Trustees

ARTHUR B. DUEL	ROYAL S. HAYNES
GEORGE B. WALLACE	EUGENE H. POOL
JOHN A. HARTWELL	BERNARD SACHS
JAMES ALEX. MILLER	CHARLES L. DANA
GEORGE D. STEWART	SAMUEL A. BROWN

Council

The President The Vice-Presidents The Trustees

The Recording Secretary The Treasurer

The Chairmen of Standing Committees

Director

LINSLY R. WILLIAMS

Assistant Secretary

FREDERICK P. REYNOLDS

Assistant Treasurer

RODERICK V. GRACE

Librarian

ARCHIBALD MALLOCH

Executive Secretary

Public Health Relations Committee

E. H. L. CORWIN

Consulting Librarian

FIELDING H. GARRISON

Legal Counsel

FRANK L. POLK, ESQ.

Entered as second-class matter, April 6, 1925, at the postoffice at Lancaster, Pa., under the Act of August 24, 1912.

Subscription $2.00 per year. Single copies, 25 cents.

THE NEW YORK
ACADEMY OF MEDICINE

VOL. III NOVEMBER, 1927 No. 11

EARLY MEDIAEVAL ANATOMY[1]

The object of Corner's book is to trace the accessible threads of continuity in the development of didactic anatomy at the School of Salerno and elsewhere during the 11th–13th centuries. It was prepared by Professor Corner (University of Rochester) during a sabbatical period abroad and largely reflects the views of Singer. The main story is simple. During the long, sterile period following the Dark Ages, there was no anatomy to speak of until the advent of Constantine of Africa, who, about 1080, translated the *Almaleki* or Royal Book (*Pantegni*) of Haly Abbas. Two books on anatomy (II, 2, 3) in this encyclopædia constituted almost the sole source of knowledge at Salerno for a century (1080–1180). Early in the 12th century there appeared three tracts on the dissection of the pig, *viz.*, a "first Salernitan demonstration," variously attributed to Copho (*anatomia Cophonis*) and to Galen (*anatomia parva*); an anonymous "second demonstration," discovered by Henschel in the Breslau Codex (1846) and re-edited by Benedict (1920); and a third discussion of porcine anatomy, known as the *anatomia Mauri*, discovered by Sudhoff in a Vatican MS. and edited by Ploss (1921). These slight performances are apparently the only existing remains of the period 1100–1150. There followed three tracts on human anatomy, known as the *anatomia Ricardi*, the *anatomia Nicolai* and the *anatomia vivorum*, which were not Salernitan but of English and French provenance. Following a clear and informing historical exposition, Corner prints a carefully-collated Latin text of the tract attributed to Copho, with translation, also

[1] Anatomical Tests of the Earlier Middle Ages. A Study in the Transmission of Culture. By George W. Corner. 112 pp. 8°. Washington, Carnegie Inst., 1927.

English versions of the "second Salernitan demonstration," the anatomy of Master Nicholas and the *anatomia vivorum*, which Töply wrongly attributed to Richard the Englishman (1922). The translations are well executed and readable. The two Salernitan demonstrations afford, as Corner says, a lively picture of dissection at the famous school and its prosectors, eager, vivacious, dogmatic, painstaking, puzzled, captious, disputatious, yet self-reliant, as "teaching from the specimen and not from books alone—an unexpected thing in mediæval anatomy, not to be seen again until the days of Mundinus." Our author demands of those who write on 12th and 13th century medicine that "by toiling over the original sources and by familiarity with the manuscripts, they learn the difficulties and the pitfalls of their subject." Some of these pitfalls have been elucidated latterly by Sudhoff, who opens fire on the mooted points in a review and three separate articles. The Copho text was originally printed in the second Latin translation of Galen (Venice, 1502), a rare book, of *presqu 'un incunable* type, which was not accessible to Corner, nor even to Choulant. Of this, Sudhoff publishes a confirmatory title page, with table of contents.[2] The more reliable 12th century Latin MS. of this text, in the Vatican Library, also escaped Corner's notice, and has now been reprinted by Sudhoff.[3] The MS. (No. 284) of the *anatomia vivorum*, which Corner unearthed at Chartres, was duly listed by Pansier in his catalogue of 1909.[4] As to the status of Ricardus Anglicus and his probable identity with Richard of Salerno, Richard of Paris and perhaps even Master Nicholas, Corner is apparently unfamiliar with the close exegesis of the English antiquarian, C. L. Kingsford (1896),[5] aside from those of Beusing (1922)[6] and of Sudhoff (1924),[7] who now prints the authentic *anatomia Ricardi* (from his *Micrologus*) for the first time.[8] These details would seem mere pedantries but for the changes of viewpoint necessitated by

[2] Sudhoff: Janus, Leyden, 1927, XXXI, 294–303, pl. III.

[3] Sudhoff: Arch. f. Gesch. d. Wissensch., Leipz., 1927, 1–18.

[4] Pansier: Arch. f. Gesch. d. Med., Leipz., 1908–9, II, 16, item 5.

[5] Kingsford: Dict. Nat. Biog., Lond., 1896, XLVIII, 201.

[6] H H. Beusing: Leben und Werke des Richardus Anglicus. Leipzig diss., 1922.

[7] Sudhoff: Janus, Leyden, 1924, XXVIII, 397–403.

[8] Sudhoff: Arch. f. Gesch. d. Med., Leipz., 1926–7, XIX, 209–239.

Sudhoff's superior control of archival material. Those who have no access to the original MSS. must necessarily accept the information vouchsafed by actual explorers until new findings give another turn to the deceptive mediæval kaleidoscope. Even Sudhoff has altered his viewpoint frequently, as new MSS. turned up. Thus, when Töply attributed the *anatomia vivorum* to Richard of Wendover, a very real clerical physician (canon of St. Paul's) who died in 1252, his statement was honestly taken on trust until exploded. It was this anonymous tract, as Sudhoff shows, and not the real *anatomia Ricardi* of the Ashmole, Basel, Munich and Vatican codices, which had been included in the works of Galen, from the Cinquecento MSS. and the 1502 printed edition onward.[9] The only genuine anatomical treatise of consequence in the Galenic Corpus is the *Encheiresis,* which was not known in print until the Aldine of 1525.

The real status of mediæval anatomy is this: up to the time of Leonardo's wonderful drawings, it was mainly porcine, simian, bovine, pseudo-Galenic, and, as far as the dry texts are concerned, more a contribution to general morphology than to actual human anatomy. But from the prehistoric (Aurignacian) period, through Greek sculpture, the Florentine paintings and Charcot's *Iconographie,* constitutional (external human) anatomy remained fresh and vital, a going concern, and even in recent primitive plastic imagery, it sometimes portrays endocrine disorders and pathological deformations. Thus, the mediæval surgeons did very well with operations on the external parts. When they opened the abdomen, they were really fishing in the dark, performing "autopsies *in vivo*" (*cf.* Leonardo's *situs viscerum*). Apart from the general European trend toward authorized human dissection *viâ* the judicial post-mortem, Corner's translations afford a perspective of the mediæval beginnings in comparative anatomy, which is highly creditable to American scholarship.

F. H. Garrison

[9] Sudhoff: Janus, Leyden, 1927, XXXI, 298–303.

THE WESLEY M. CARPENTER LECTURE

THE FUTURE FOOD SUPPLY OF THE UNITED STATES

ALONZO E. TAYLOR

(Delivered before The New York Academy of Medicine, October 20, 1927)

Introduction

In matters of science, as in heresy, one may as well be hung for a sheep as for a lamb. In what follows the writer does not undertake to instruct; nor are his utterances to be taken as a record of research. What follows is interpretation of the *status quo* applied to prophecy. The modest undertaking is to forecast the food supply of the United States a half century hence. Placed on record in the conspicuous publication of The New York Academy of Medicine, the forecast will remain available for scientific reappraisement.

A prophecy is essentially the projection of existing knowledge into the future. Let us make no assumption of new discoveries, confining ourselves objectively to an appraisal of the developments probable under existing knowledge and demonstrated practice during the next two generations. In particular, all suggestions of factory synthesis of foodstuffs shall be avoided. The interpretations may fall into error and the forecast be thereby vitiated. Unforeseen developments may eventuate. But in any event, the prediction will not be encumbered with hypotheses.

The food requirements, in terms of heat units per statistical adult man, depend on the climate of the region and the nature of the occupations. Food requirements are further influenced by housing and raiment. The diet of a people in any period is the product of numerous factors—climatic, geographic, economic, physiologic, psychologic and sociologic. In the most enlightened community, the influences of religion and custom persist. Geography, climate, composition of soil, and rainfall determine agricultural production in kind and in quantity. With perfection of communications and transportation, regional restrictions upon consumers are reduced or abolished, being in fact replaced by economic limitations. The diet of a people is

conditioned on purchasing power, and it thus becomes one expression of the state of material civilization. Finally, the diet of a people is influenced by the state of medicine of the period, as expressed in precept and in educational movements.

In any prediction of the future food supply of a people, one must take adequate account of the natural resources of the region involved. In judging resources, one must not rigidly separate food supplies from industrial materials, since these overlap both agriculturally and technologically. Broadly considered, the United States are a nearly self-sufficient unit for the prospective population. We are richly endowed with natural resources. We lack certain essential materials, such as tin, nickel and platinum; we are dependent for rubber on regions outside of the continental United States and entertain no prospect of synthesis to replace tropical rubber. Shortage of forest products seems certain to develop. On the other hand, many goods now imported are replaceable. Tropical oil seeds are readily replaceable with domestic oil seeds. We import coarse wool because our agriculture is too highly civilized to warrant its production; we import fine wool for economic rather than for agricultural reasons. We import hides because we do not need as much meat as would be furnished by the animals whose hides we need. Our huge imports of sugar are not the consequence of inherent agricultural limitation. Naturally we are dependent on imports for coffee, tea, chocolate and spices and for tropical luxuries.

In undertaking the forecast of a future food supply, it would avail us little to consider it on the strict basis of geographical self-sufficiency. Making no predictions as to the future political status of the West Indies, Mexico, Central America, the Philippines and Canada, it is to be assumed that we shall always be able to exchange our products for desirable materials that we can not produce at all, or only at high price. Border trade will always persist. The proximity of Canada and the long extent of the boundary are facts of great importance to our future food supply. It would be to no purpose to discuss for the United States the concept of a self-sufficient agrarian and industrial state. To the writer, the need to develop self-sufficiency of the United States in defense against other white nations is unthinkable. The need for self-sufficiency in defense against colored

races is equally unthinkable, for the period of time contemplated in this forecast. In the humble opinion of the writer, the problem of the next half century, based on the experiences of the past century, will not be the defense of the white race from colored races, but the protection of colored races from exploitation by the white race.

The following forecast is based upon a series of assumptions and predications, all of which are grounded on sound science and confirmed experience. Let us develop these in their order, following which the several elements in the forecast will be presented in summarized form.

Growth of Population

Let us begin with a predication of population. Accepting the mathematical treatment of growth of population lately developed by Pearl and Reed, Knibbs, Hotelling and others, we assume that the population of the continental United States fifty years from now will be something like 180 million, and that the maximum population of this area will be something like 200 million. This is to be regarded as our optimum population, the point of most favorable ratio between population and resources. For our present purpose it is immaterial whether the formula of Pearl is logistic or merely empirical. The population thus predicted is of course widely at variance with primitive Malthusian notions. Curiously enough, suggestions of limit of population are decried alike by Malthusians who fear large population and by jingoes who desire it. Such a projected rate of growth of population (with which our increase of population to date is consistent) lies inherent in the high standard of living implied in an efficient material civilization. No country suffering from high birth-rate and low standard of living can solve the problem of congestion of population by emigration. Countries with high standards of living and low birth-rates have neither ethical nor economic justification for unrestricted immigration. Therefore, restriction of immigration is to be accepted as a permanent policy. With the low birth-rate and a death-rate declining through perfection of public hygiene and advancement in medical science, the average expectation of life will be substantially prolonged. In consequence, the age distribution of the population fifty years

from now will be somewhat different from that of to-day. In our forecast, therefore, we envisage the feeding of 180 million Americans fifty years from now, on a diet adapted to the then population, under the circumstances of material civilization reasonably to be anticipated in the arts and sciences.

Mechanization

We predicate the continued mechanization of the material operations of civilization. Machines will continue to replace work animals; this will result in a declining per capita ratio of work animals, with corresponding saving of feeding stuffs. Machines will continue to replace manual labor in fields[1] and forests, in constructions, in factories and in the channels of transportation and distribution. Occupations will become progressively more sedentary, with corresponding reduction in food requirements. Hours of labor will be reduced. This has already progressed during the past fifty years, to the extent of saving several hundred calories in the daily per capita food requirement; we take it this will continue during the next two generations, with corresponding further saving. As a small offset to this, we allow for some increase in food requirements due to the expansion of sports and outdoor recreations to replace manual work as exercise.

Reduction of Waste

Extensive waste exists to-day in the distribution and utilization of foodstuffs. There is waste on the farm, in transportation, in terminals, in manufacturing processes, in wholesale and retail distribution, in the kitchen and on the table. Waste involves both edible and inedible materials, and some waste consists in permitting edible materials to become inedible. We cannot agree that waste is the concomitant of prosperity, that high national income makes national waste negligible. To some extent waste is the expression of extravagance and misdirected social refinement. But, for the most part, waste is the result of faulty technique in production, transportation and distribution and of inefficient practices in manufacturing. It is safe to pre-

[1] Mechanical power is now believed to equal manual labor in American agriculture.

diet a high degree of ultimate success in the elimination of waste, with a corresponding narrowing of the margin between producer and consumer, to the economic gain of both.

Per Capita Food Requirement

Accepting the compilation of Pearl as the basis of computation for the United States, the current consumption per adult man (ingestion plus edible waste) is apparently somewhere around 4,300 calories per day. Pearl's figure for calories ingested was 3.424 per adult man per day. It is difficult to believe that on the average actual ingestion now corresponds to over 3,200 to 3,300 calories per day per adult man. A generous ingestion for a population of the sedentary characteristics that we predicate for the country two generations hence would be not over 2,800 calories per adult man per day.

These figures illustrate the diminution to be attained through control of waste and reduction of manual labor. Let us make the reasonable assumption that fifty years from now it will be necessary to provide no more than 3,300–3,400 calories per adult man per day, to cover ingestion plus waste, corresponding to 2,800–2,900 calories for actual ingestion. This would correspond to a saving of waste of some 500 calories per adult man per day and a saving in ingestion of some 400 calories per day. Despite the outstanding development of efficiency represented in these savings, they are internally and technically to be termed reasonable. We shall need to raise somewhat more food, but lowered waste and ingestion will represent substantial gains.

Distribution of Calories Among the Components of the Diet

According to Pearl, the average diet of a few years ago, as ingested, contained 114 grams of protein, 127 grams of fat, and 433 grams of carbohydrate, corresponding together to about 3,424 calories, per adult man per day. Pearl regarded the figure for fat as somewhat too high, which would bring the total figure for calories down under 3,400, but still above 3,300.

Diversification of the Diet. A pronounced diversification of the diet, in the direction of increased use of fruits and vegetables, is characteristic of the present. This is to be expected to con-

tinue. There are many obvious reasons for the increasing use of fruits and vegetables—improvement in quality, prolongation of seasons, perfection of processes of packing, and healthfulness. One effectual motive lies in the necessity of increasing the bulk of the diet in relation to declining caloric content. The dimensions of the alimentary tract are relatively constant. The higher the requirement in calories, the more concentrated must be the diet. Therefore, hard workers choose fats and cereals. The lower the requirement in calories, the less concentrated need be the diet. Since it is undesirable to have the bulk of the diet fall below a certain minimum, the natural adaptation is to expand the use of foods of large bulk and low caloric content—namely, fruits and vegetables. After this fashion, it is possible to eat heavily in terms of satisfaction and at the same time eat lightly in terms of calories, a practicable adaptation.

Having predicated a future intake of 2,800–2,900 calories per adult man per day, how would we expect these to be distributed in terms of nutritional components? We suggest 75 grams of protein, 100 grams of fat, and 400 grams of carbohydrate per adult man per day.

Protein. The traditional American diet, like that in Canada and Australasia, has been rich in meat. Possibly some of our vigor has been due to the high protein intake; but we suspect it was due to the life in the open spaces on which the meat was raised rather than to the protein itself. The literature on experimental protein requirements, medical records on lower protein intakes, and widespread experiences of vegetarians are in agreement that high-protein rations are unnecessary. The metabolism requires daily a certain amount of amino acids and particular amino acids need to be adequately represented. Ingested in excess of metabolic requirements, protein is burned as fuel. Protein carries no special virtue as fuel, quite the contrary; a gram of starch and a gram of protein have about the same heat value, but protein leaves an acid ash and the salts and nitrogenous end-products of meats impose a labor of elimination. Ingestion of protein beyond a generous allowance for metabolic purposes entails physiological waste and is commercially uneconomic. Seventy-five grams of protein, ingested, constitute a reasonable allowance from the standpoint of the *cuisine* and a

generous allowance from the standpoint of metabolic requirements for all ages.

It would seem safe to stipulate that 20 grams of the 75 grams of protein should be in the form of milk protein, corresponding to an intake of about two-thirds of a liter of milk per day. Milk contains three valuable constituents: the proteins, that are particularly well balanced, the salts, and vitamine A. In view of the ease with which balanced salt mixtures are prepared, and the ready availability of vitamine A outside of milk, we take it that in future the protein of milk will represent its most valuable ingredient. This inference happens to agree admirably with the fact that the dairy cow is the nucleus of the most effective type of diversified agriculture.

If 20 grams of a protein ration of 75 grams are contributed by milk, this would leave 55 grams to be secured in other foodstuffs. Our diet is becoming continuously more diversified by the expanding use of fruits and vegetables. Most of these, apart from the legumes, are poor in protein; indeed, this is one of their admirable qualities. If the average cereal intake were 300 grams per day, this would contain some 25 grams of protein, and leave 20–25 grams to be covered by beef, pork, mutton, lamb, poultry, eggs and fish (depending on the fruits and vegetables in the diet).

We take it that the consumption of poultry and eggs will continue to increase, while that of beef, pork and fish will decrease. There is no way of forecasting distribution among the meats, and no purpose in doing so, since the diet in some regions will differ widely from that in others; and, within the same region, individuals will differ widely in their choice of more or less meat as against more or less cereal. I have elsewhere[2] suggested as possible a ration of 120 pounds of beef, pork, mutton and lamb as reasonable in the future diet. This figure may be held to be the outside figure. It seems likely that our Anglo-Saxon tradition of taking meat straight will be modified in the direction characteristic of the French *cuisine;* only in this manner can the flavors of meats be utilized with the avoidance of a heavy intake of meat.

Fat. Of the suggested intake of 100 grams of fat per day, the largest single fraction would be composed of milk fat, something

[2] *Population Problems in the United States and Canada,* Publications of the Pollak Foundation for Economic Research, No. 5, pp. 94–110.

like 25 grams, the fat content of two-thirds of a liter of milk. In addition, we take it that another 10 grams, or more, would be ingested in the form of butter fat, of which the corresponding milk protein and milk sugar would be used for domesticated animals. Possibly 10 grams of fat would be ingested incidental to the intake of cereals, fruits and vegetables. This would leave 55 grams to be ingested in eggs, poultry, beef, pork, mutton, lamb, and vegetal oils. A portion of this would be ingested with the meats, the remainder as fat or oil preparations of one kind or another. Vegetal oils may be expected to continue a prominent component of the diet; increased use of fruit and vegetables means enlarged use of salads, and salad oils are vegetal. American taste seems to favor bland vegetal cooking oils over animal fats, as illustrated in the preference for vegetal lard substitutes over lard. There is, however, no purpose in attempting to forecast the components of the fat ration, since they will vary from region to region and from individual to individual. Possibly the total figure for fat will fall below the 100 grams suggested, since fat is the fuel of hard workers; with a sedimentary population, fat loses caste in the diet.

Carbohydrate. The intake of carbohydrate in all forms is set at 400 grams per day. The figures for fat and carbohydrates should not be taken rigidly, since some individuals will prefer more fat than 100 grams and less carbohydrate than 400 grams, while others will follow the opposite taste. Of the 400 grams of carbohydrate, we may be sure 100 will be in the form of sugar, and this undeterred by whether it would be agriculturally possible or not for the United States to grow this amount of sugar. The expanding use of fruits entails a high consumption of sugar. Sugar is not to be viewed as replacement of alcohol, but for various extraneous reasons sugar consumption is increased in the absence of alcohol. Of the remaining 300 grams of carbohydrate, it would be reasonable to suggest that 200–240 grams would be in the form of cereals and 60–100 grams in the form of potatoes, all other vegetables, and fruits. Here, again, it is to no purpose to segregate the components of the carbohydrate ration, since these will vary from region to region and from individual to individual.

Such an average food supply, ingested, would correspond to between 2,800 and 2,900 calories, representing some 75 grams of protein, 100 grams of fat, and 400 grams of carbohydrate. What segregation into the different classes of natural foodstuffs is to be suggested?

Composition of the Diet

It will be better to offer such a segregation, not in terms of foodstuffs as ingested, but of foodstuffs for consumption, including ingestion and waste. This may be secured in some such manner as follows:

Milk and products	550	calories
Cereals	1,300	"
Meats	600	"
Vegetal oil, nuts, fruits, vegetables	600	"
Sugar	450	"
Total	3,500	"

This set-up is, of course, not directly comparable with 75 grams of protein, 100 grams of fat and 400 grams of carbohydrate. It is the supply, including waste, from which the average diet would be drawn.

Five hundred and fifty calories in the form of milk would correspond to two-thirds of a liter of whole milk and the butter fat of one-third of a liter. The 1,300 calories to be allotted to cereals could be secured from some such combination as wheat-flour 240 pounds, corn products 40 pounds, and other cereal products 20 pounds, per year per person. The sugar calories would require something over 100 pounds of sugar per year. The 600 calories per day to be furnished by meats could be secured in some such combination as 50 pounds of beef, 6 pounds of lamb, and 64 pounds of pork per year, average of carcass weights. The present consumption of beef and veal is in the neighborhood of 70 pounds per person per year; that of pork is nearly 90 pounds per person per year; that of mutton and lamb less than 6 pounds per person per year. Apparently, our present per capita annual consumption of poultry and eggs is not far below 30 pounds per person per year. The suggested intakes for fifty years hence

represent, therefore, a substantial reduction from the high meat intake to which we have been accustomed. With each decade, each average pound of meat will represent fewer calories, because obtained from younger and leaner animals. Therefore, one must not too rigidly translate into meat of the present composition the number of grams of protein suggested for meat in the future; the figure suggested for meat protein per day—25 grams—must not be checked rigidly against the weights suggested for the annual meat intake, namely 50 pounds of beef, 64 pounds of pork, and 6 pounds of lamb.

Vitamines and Mineral Salts

Vitamines. A few years ago it seemed that the adequate provision of vitamines would be an economic as well as a physiological problem. More recent researches, however, have made it clear that the supply of vitamines will not constitute a problem in the future. An adequate supply is crucially essential, but a surplus is not. We now possess a wide knowledge of the distribution of the five known vitamines, their concentration in various foodstuffs, and their perishability under different conditions. Also, effective advances have been made in the isolation and concentration of vitamines. Finally, recent researches on the influence of light in endowing foodstuffs with a protective action against rickets, suggest prospects for the future.

Vitamines A, B, C, D, and E are each present in a relatively large number of common foodstuffs. It is out of the question to expect each foodstuff, or even each meal, to be balanced in respect of vitamines. This conclusion is re-enforced by the fact that the body stores vitamines; thus the diet of the day does not need to provide the vitamines of the day. The expanded use of raw fruits and vegetables has extended the list of foodstuffs containing thermolabile vitamines. Diversification of the diet may be depended upon to guarantee an adequate ingestion of vitamines for all ages.

It is gradually becoming known that it is possible to prepare concentrated extracts of vitamines. Illustrations are the preparations of vitamine A in cod-liver oil and of vitamine E in the oil of the wheat-germ. We take it that for each of the vitamines sources of high concentration will become available and they

can be administered when desired. Furthermore, it seems certain that manufacturers of compounded foods will include vitamines in their preparations. One of the principal counts against butter substitutes has been lack of vitamine A, a criticism not removed by the fact that some butters are deficient in vitamine A. It is now readily possible from vegetal oils to manufacture margarine, with the addition of vitamine A, and others, if necessary, secured from appropriate sources.

Under these circumstances it seems reasonable to conclude that the problem of the vitamines is solving itself through diversification of the diet, the increased use of raw fruits and vegetables, the artificial addition of vitamines to butter substitutes and other compounded foods, and the commercial preparation of concentrated extracts. I take it that two generations hence the supply of vitamines will give no concern.

Mineral Salts. An adequate supply of mineral salts, including the essential anions and cations, is a pre-requisite of the diet. With growth of population, and in the fulfilment of sanitary precautions, the supplies of water for domestic purposes will tend to become concentrated into larger units and to undergo appropriate chemical treatment as well as filtration. This involves larger use of impounded surface waters, with less use of naturally percolated waters. This tends to influence the saline content. The correction lies in the appropriate use of salt in the preparation of food. So far as sodium chloride is concerned, the average diet is already too rich. The salt intake, however, is often unbalanced, of which lack of iodine in some regions is an illustration. It seems probable that a certain relationship of anions and cations is essential in the development of the skeleton, though the subject is not yet worked out. There is no reason why table salt should not be balanced in the same sense as the balanced salt solutions employed in experimental biology. The freer use of fruits and vegetables and milk implies increased intake of organic salts, tending to balance between anions and cations. Fruits and vegetables also, with few exceptions, leave an alkaline ash that is of importance in the avoidance of acidosis. For mineral salts, still more than for vitamines, it is long-term rather than transient effects that are sought, which simplifies the problem for oncoming generations.

Efficiencies to be Attained in Production

Beyond the present food supply, that needed for the population of 180 million fifty years hence will include five groups of increment: (*a*) the foodstuffs we now export; (*b*) those saved by reduction in waste; (*c*) those set free by lower per capita requirement; (*d*) those secured through increased out-turn in production per area and per animal, and (*e*) those obtained by expansion in acreage and in number of animals.

Plant Crops. The primary foodstuffs, together with the feeding stuffs required to sustain the domesticated animals needed to secure the secondary foodstuffs in the predicated diet, represent a considerable enlargement over present production. This remains true even when we transfer to domestic use the plant crops now passing into export. The needed additional amounts of grains and other plant crops would involve larger yields per acre or increase in acreage. Both may be expected to occur. Our yields of grains per acre are relatively low, not merely for intensive agriculture but also for extensive agriculture. In every state a considerable proportion of the farmers raise from a fourth to a half more per acre than is secured by the remaining farmers, and this from comparable soils. It is not necessary to use what are called "master farmers" as standards for future accomplishment. It is merely necessary to use as standard the best third and to assume that during the next two generations the majority of farmers will be able to accomplish what the best third now do. The best third of farmers fifty years hence will secure considerably larger out-turns than the best third secure today. It is reasonable to assume that fifty years hence the average yield of grain per acre, also of hay and other roughage, will be a fourth to a third larger than it is today. This predicated increase represents crop yields still substantially lower than representative yields in western Europe. Nevertheless, it is believed these added yields can be secured without transferring American agriculture from the basis of out-turn per man to out-turn per acre. The predicated yields of plant crops are conditioned on the successful control of plant diseases, a campaign which, it must be conceded, becomes more difficult with increasing population. It is to be anticipated that some expansion will occur in the use of

land devoted to the raising of industrial raw materials, a competition partly compensated for by extension in industrial uses of crop residues such as straw and corn stalks.

Milk Production. In the place allotted to milk in the diet fifty years hence, use is made of a considerably larger milk ration than is at present available. This is a point of especial importance both for nutrition and agriculture.

Production of milk per cow per year varies from less than 1,000 pounds to as much as 30,000 pounds. The average for the country is supposed to be in the neighborhood of 4,500 pounds per annum. The causes of the extraordinary variations between different cows lie in breeding, selection, and diet.

Cows belonging to selected milking strains are characterized by metabolic impulse in the direction of milk secretion. On a balanced and generous ration, the cow of beef breed will secrete little milk and lay on flesh, while the cow of milking breed will secrete much milk and lay on no flesh. Milk secretion is a specialized biological process, as breeding and cow-testing tell. The average production in Denmark and Holland is considerably higher than in the United States; the average production in some states is much higher than in others. With every decade, through selection, the average secretion is enlarged; the percentage of pure-bred cows rises, cross-breds are augmented and improved and poor milkers are culled out. Looking back over the result of the past generation, it seems reasonable to predicate for fifty years hence an average secretion of not less than 6,000 pounds, possibly closer to 7,000 pounds, per cow per year. This would be an outstanding accomplishment for the entire country, but a modest accomplishment judged by individual cows.

With a milking strain of cows, the yield of milk depends on the action of certain secretory stimulants contributed by green feeds and on the adequate supply of nutrients to cover the maintenance of the animal and the constituents of the milk, particularly the protein. The stimulatory substances of green feed are readily supplemented with ensilages. To cover protein requirements, increased use will be made of high-protein concentrates, freely available within the United States.

The present number of milch cows in the United States is some 23 million.[3] The objective is not to secure more cows of the same out-turn but fewer cows with larger out-turn. Diversified agriculture rotates about the milch cow; but the progress of diversification depends on improvement in cows rather than on increasing the number of cows, since the rentability of a dairy cow is the expression of ratio of maintenance units to milk-production units.

Beef Production. Increased efficiency in production of beef is to be attained through selection of improved strains, reduction in mortality of the new-born, control of diseases, and perfected management in feeding. This all is proved practice. With each decade, beef cattle will be finished and slaughtered at an earlier age. This involves breeding for early maturity animals that tend to produce meat rather than fat. Such cattle yield a considerably higher ratio of edible meat to nutrients employed during the lifetime of the animal. In the corn belt some farmers secure half again as much live weight per unit of corn as do their neighbors. In all probability, American practice will follow that of Europe in the wider use of veal, both from beef cattle and from dairy cattle. We have several unsolved problems of cattle diseases in the United States. Our forecast does not assume, except in the case of Texas fever, that these will be eradicated; but it is proper to assume that losses due to exposure of the new-born will be reduced, and calf-crop percentage improved.

Pork Production. In the case of hogs, the next two generations will witness the gradual decline of hogs of the lard-type, with substitution of hogs of the bacon-type. This will be the result of economies to be achieved in breeding hogs of quick growth and early maturity, yielding a maximum of lean and a minimum of fat and giving a high ratio of edible meat to nutrients employed in feeding. It is wasteful to raise hogs as producers of fat, since oils physiologically comparable to lard are more cheaply produced in the plant world. Some farmers turn out a hundred pounds of live hog for eight bushels of corn, while others use a

[3] A discrepancy exists in the several estimates relating to milk production. The figures for number of cows kept for milk, gross annual milk production, and annual production per cow are not in concordance. But the discrepancy does not involve the validity of our conclusions.

dozen bushels for the same return. Outstanding causes of loss in hogs are cholera parasites and death of the new-born. These are preventable diseases, and eradication is a question of effective control. The average litter of pigs in the United States is now around 3.5; it is reasonable to forecast for fifty years hence a substantial increase in the size of the litter brought to maturity. If demonstrated practices in breeding and feeding hogs, already in use with hundreds of thousands of hog raisers, could be applied to all, it is not going too far to assume that the meat outturn might be increased 30 per cent. per average census head of hogs. The efficiency thus to be achieved would represent a large relative saving in acreage, the result of improved ratio of maintenance requirements to productive out-turn.

Sheep Production. In the case of sheep, our practice is becoming stabilized. The national herd of sheep has a dual purpose, production of meat and of wool. Agriculturally also, sheep play a rôle in the utilization of otherwise wasted forage. Sheep wear out rapidly, and since the weight of the clip of wool falls off after the third year, a term is set to the profitable life of the ewe. Public taste is in the direction of lamb and away from mutton. It is, therefore, reasonable to assume that fifty years hence sheep will have acquired a stabilized position in agriculture: the excess of male lambs will be slaughtered for food; the breeding stock will be carried along for wool production; and the obsolescent animals will be disposed of for industrial materials and tankage.

Developments in Agriculture

Based on the experiences of other countries, it is possible to adjudge the population-carrying capacity of the United States. On the basis of representative European crop yields, the United States could support some 500 million people on a largely vegetarian diet, in which cereals and legumes would form the chief sources of protein, with only such animal products as could be secured from inedible residues and forage on land not adapted to the raising of primary crops. On a lacto-vegetarian diet, something like 400 million people could be sustained. On a diet comparable to that of Germany before the war (something a little poorer that that of England, in the matter of meat supply) a

population of 350 million could be supported. With agricultural productivity increased one-half, our present food supply could be secured for possibly 300 million. These rough figures indicate in themselves how little agricultural expansion would be required to sustain a population of 180 million on the physiologically generous diet predicated above.

We are at present a relatively heavy net exporter of grain and pork products. Nearly 30 million acres (outside of cotton) are now devoted to raising produce for export. Two hundred million bushels of grain and two billion pounds of pork products contain the calories necessary to sustain some 20 million people, and our population could, therefore, increase considerably without necessitating any expansion of agriculture for grains and pork. On the other hand, we are net importers of vegetal oils and of sugar, outside our insular possessions. In our thesis, however, it was never contemplated that this country should become self-sufficient in sugar or vegetal oils, though agriculturally it could easily do so at a higher price.

What acreages planted in primary foodstuffs would be required to furnish the cereals and other plants denominated in the suggested ration for the population of 180 million people fifty years hence?

The yields of corn per acre are relatively high, those of small grains relatively low in the United States. With an increase of average yield of wheat to only 20 bushels an acre it would require something like 65 million acres to cover the predicated need for wheaten flour. The coarse grains and pasturage would require some additional acreage over the present, depending on achievements in the direction of increased efficiency in the raising of animals. We take it that the expanding requirements of fats and oils for industrial uses will necessitate larger imports into the continental United States, though possibly these may be procurable from the Philippines.

The amount of milk required (with liberal allowances for waste and use by animals) would be in the neighborhood of 160 billion pounds per annum. The present production is 120 billion pounds, the out-turn of approximately 25 million milch cows. An increase in the average out-turn from 4,500 to 6,000 pounds per annum would nearly cover the requirement. The full amount

stipulated would be secured either through a somewhat higher out-turn than 6,000 pounds per annum or by increasing the count to not over 30 million cows. In any event, it is clear that the predicated milk supply could be secured with a few more animals and with only a small increase in acreage devoted to them, directly and indirectly.

At present (averaging post-war figures) we slaughter annually something like 32 per cent. of the cattle reported on the first of the year; the average yield of dressed beef (not including edible parts other than meat, which are held to balance inedible portions of the dressed carcass) is about 340 pounds. Therefore, the average annual yield of carcass meat per census head of cattle is about 110 pounds. Fifty pounds of beef and veal per person per annum for a population of 180 million people would amount to about 9 billion pounds per annum. With the same kind of cattle we now have, this would require something like 80 million cattle. Accepting demonstrated practices in breeding, in feeding for earlier slaughter, and in reduction of mortality of the new-born, it seems reasonable to raise the figure of average outturn from 110 pounds to 130 pounds. Using this figure, the required beef will be procurable from 70 million cattle other than milch cows, little above the present count and requiring only a small additional acreage over that now devoted directly and indirectly to cattle.

According to current practice, the ratio of slaughtered hogs to number of swine on the first of the year is a little over 1; the average return in carcass weight per slaughtered animal is about 170 pounds or about 180 pounds per census head. Assuming the replacement of lard-type hogs by bacon-type hogs, demonstrated average efficiency in feeding for early slaughter and increase in the average litter from 3.5 to 5.0, it follows that to furnish 64 pounds of pork per person per annum for a population of 180 million would require less than 70 million hogs. This figure is little above the present count of swine, and only a small increase would be required in acreage devoted directly and indirectly to the raising of hogs.

We are now slaughtering annually something like 16 million sheep for meat, which is less than 40 per cent. of the count at the first of the year. Since the average dressed weight is under 40

pounds, each census head of sheep furnishes less than 15 pounds of meat. Seventy million sheep would furnish the per capita lamb ration of 6 pounds per person for the population of 180 million fifty years hence. This number could be easily and advantageously carried, since our wool requirement will be far greater than the out-turn of that herd.

A computation of the acreage requirements of domesticated animals, at the assumed level of efficiency, indicates that something like 25 million additional acres might be required over those now correspondingly devoted to animal husbandry, in order to furnish the stated amounts of milk and meat for the population of 180 million fifty years hence. The additional acreage required for wheat and other primary foodstuffs, at an estimated increase in yield of not to exceed 25 per cent. over the present, would be something like 25 million more. In short, the population of 180 million fifty years hence (on the plane of agriculture reasonably forecasted from current practice and demonstrated improvements) might require an expansion of the agricultural plant of something like 50 million acres.

Against this predicated increase in acreage, one must set a subtraction corresponding to the relative decline in acreage requirements of animal husbandry due to shorter average term of life, larger out-turn of carcass weight per census head, and reduction in horses and mules. The reduction in number of horses and mules during the past decade has represented a saving of some 12 million acres of corn and oats and 8 million acres of hay. The recent rate of decline in horses and mules suggests a count of something like 10 million in a decade or two, which further reduction would represent the saving of another 20 million acres.

The area of the country is approximately 1,903 million acres. At the last decennial census, the land in farms was about 503 million acres, with some 365 million acres in harvested crops. About 20 per cent. of this was devoted to primary foods, 70 per cent. to harvested forage crops, and 10 per cent. to the growing of industrial materials. Domesticated animals (maintained on the present inefficient plane) now consume all of the utilized products of unimproved lands and three-fourths of the products of improved lands.

We have something like a billion acres of pasturage land, of which nearly 600 million are forest range and semi-arid land. Some 600 million acres are fit only for grazing, and we have some 335 million acres classed as humid pasture. Of some 480 million acres of forest range, only half are in pasture. We have apparently something over 200 million acres not now used for crops, pasture or forest, of which half is adapted to one of the three. The uncultivated arable land lying in farms is considerably over 40 million acres. A few million acres of land now classed as arid will be brought into use for crops through reclamation, involving an intensive form of cultivation with high yields per acre. Reclamation also will provide more water for lands already in cultivation. There can be no question that 50 million additional acres will be readily available for the predicated expansion of agriculture during the next fifty years, and this without inclusion of land deserving the term "sub-marginal."

The land in question would be sub-marginal to-day if used for raising staples for export; it will not be sub-marginal fifty years hence for the country upon a domestic basis. During the next fifty years, it seems to the writer, we shall pass from the status of a net-food exporter to that of a net-food importer. We shall need to import nothing that we could raise at home, except sugar and vegetal oils for industrial purposes; these also could be raised at home for a population of 180 million people, but we judge it will not be economic to do so. But in any event, fifty years hence with a population of 180 million people, we shall no longer be net exporters of wheat, rye, corn, barley, oats, beef, pork, lard, mutton, dairy or poultry products. We have already ceased to be net exporters of some of these; we shall cease to be net exporters of any of them. With the shift from the exporting to the domestic basis will come a shift in the definition of sub-marginal lands.

Viewed from the standpoint of agricultural potential, with the use of internal evidence of current agricultural accomplishment, without appeal to theory, we regard it as self-evident that the soil of the country will be able to provide the foodstuffs required for the stipulated diet. To one of sanguine temperament it is not at all unthinkable, or improbable, that the predicated food

supply for the predicated population fifty years hence could be raised on a farm area no larger than the maximum acreage that has already been included in agricultural operations within the United States. It is a common statement that two and a half acres of land are required to support one human being. Two hundred million people should have no trouble living well upon our continental area. The land problem fifty years hence will be for forest products, not for food supplies.

In conclusion, it remains to advert briefly to several general interrelated questions—the size of the farm population, the maintenance of soil fertility, the availability of motor fuel, and the continuation of exports. If fifty years hence agriculture has achieved the modest efficiencies predicated in earlier paragraphs, if mechanization has advanced to the extent reasonably to be anticipated, if motor fuel is available at no excessive cost, if soil fertility is maintained with the predicated number of domesticated animals and the use of chemical fertilizers, and if, finally, the agriculture thus arrived at is employed solely to feed the native population of 180 million, then the size of the agricultural population will be relatively low. If, on the other hand, these expectations do not eventuate, the farm population will remain relatively larger. It is difficult to believe that invention and improvements in implements, and advances in control of plant and animal diseases and in selection of improved strains will fail to permit of and to insure the modest improvement in efficiency that we have predicted. The development of reforestation, not included in our appraisal, seems to the writer the most difficult problem of the land.

Our present agriculture, for the most part, is based on yield per operator, not on yield per area. The next fifty years will witness some transfer from extensive to intensive farming. Improved farm machinery already available will facilitate both intensive and extensive cereal culture. Mechanical harvesting of corn and cotton are now almost perfected and will become general in the future. In other lines, improved farm implements will be conducive to intensive farming. It has been loosely assumed that intensive farming, the striving for out-turn per area, inherently implies intensive use of hand labor. This is assumed,

but we take it that the future mechanization of agriculture in the United States will be applied as effectively to intensive as to extensive farming. Also, we take it that developments in use of implements will carry with them cooperative farming on the productive side as well as in marketing.

Fertility of soil depends on methods of cultivation, contributions of natural manures by farm animals, and chemical fertilizers. With the predicated number of animals—10 million horses and mules, 30 million cows, 70 million other cattle, 70 million hogs, and 70 million sheep—the animal manures in units of nitrogen, potash, phosphate and humus would compare with present practice. This will not be enough to maintain soil fertility, and increased use will need to be made of chemical fertilizers, whose application will be cheapened by development of appropriate implements. Atmospheric fixation of nitrogen and by-product recovery of ammonia, together with the use of legumes in crop rotation, will take care of the nitrogen requirements. Phosphates we posses in abundance. Potential potash also we possess in abundance. Possibly the newly discovered deposits in Texas and New Mexico will yield cheap potash after the initial capital investments have been put in; for the rest, it seems likely that potash from the widespread and extensive deposits in the western United States will become available only at increased price. Contrasted with other regions of the world, the United States occupies a favorable position in chemical fertilizers.

Effectual replacement of manual labor by machines depends on motor fuel at relatively low price, since the cost of fuel is one of the elements in achieving low labor cost of farm operations. Hydrogenation of coal and alcoholic fermentation of straw and other crop residues are passing out of the experimental stage and entering into commercial production. Without assuming the continuing availability of cheap petroleum (from oil sands or shales), we take it that fifty years hence the use of motor-driven farm implements will not be conditioned by high cost of fuel.

With respect of continuation of exports, we face here political philosophy as well as agricultural efficiency. There are 100 per cent. mercantilists who, accepting our estimate of population fifty

years hence, believe that under intensive agriculture and mass production with the use of perfected implements, we can continue to remain large-scale exporters of staple foodstuffs. Persuaded that we shall need to use such exports to pay for essential imports, these mercantilists are constrained to believe that our production costs can be kept low enough to enable us, with remuneration to the producing class, to continue to maintain a prominent position in the export markets of the world. It seems to the writer that the mercantilist colors his expectations of production costs to fit his ideas of international trade. With full consideration of the attainment in agriculture of low labor cost with high wage level through the utilization of manifold scientific and mechanical appliances, there still remains something incongruous in the idea of a country with low birth-rate and stationary population and a high standard of living, engaged in feeding backward countries with high birth-rate, expanding population, and low standard of living. The broad proposition of the mercantilist is not proved by the fact that we now furnish small amounts of rice and raisins to China. To the writer it seems more reasonable to conclude that fifty years hence we shall have ceased to be a net exporter of staple foodstuffs, though continuing some export of specialties embodying a small contribution of soil and a large contribution of skill.

The present farm population[4] is approximately 25 per cent. of the total population. With each decade, the out-turn of prod-

[4] According to the United States Department of Agriculture, the farm population (people living on farms) is in the neighborhood of 28 million. We suspect it is nearer 30 million. We lack precise definition and dependable enumeration of farm population. The term rural population, as used in the census, includes inhabitants of towns up to an arbitrary figure. Mere residence on farms does not imply inclusion in farm population, if the estates are not operated commercially. Inclusion in farm population cannot be limited to full-time operators, because many lines of farming are part-time occupations whose operators seek urban employment during certain seasons. Many farms are operated, with or without hired help, by owners living in towns, and such operators ought to be included in farm population. With improvement of roads, it is to be expected that more and more farmers will live in towns rather than on their farms. The broad way to define farm population would be to include all landowners and tenants who raise farm produce for sale or for family subsistence, but even this definition would involve difficulties in classification and impose heavy labor on census officials.

uce per head of farm population rises. It does not seem unreasonable to predict that the farm population fifty years hence will not be over 35 million, or 20 per cent. of the total population. We take it for granted that fifty years hence information on economics will be so widely disseminated as to exclude the agrarian notion that it is necessary to carry a surplus farm population as insurance of the food supply. It may seem necessary to maintain standing armies and munition industries as insurance against war. But it ought not to be necessary to maintain a surplus farm population, unremuneratively employed, as insurance against shortage. It is not the size of the agrarian class, but its well-being, that is important. The problem of the future is to balance the farm output alike in the interests of maintenance of soil, remuneration to operators, and the diversified dietary of the people. The future social organization will be the product of the land, the population, the development of the arts and sciences and the standard of living.[5]

Section of Medicine, February 17, 1927

CARDIAC ASTHMA[1]

MORRIS H. KAHN

The Mechanism of Dyspnea

The respiratory system gives rise to the premonitory symptoms in heart failure, of which distress in breathing, or dyspnea, in response to effort is often the earliest sign. The respiratory center in the medulla is extremely sensitive to a deficiency of oxygen or to an excess of carbon dioxide in the circulating blood. It is also sensitive to toxic products produced in the body under special conditions, to non-volatile acids such as lactic acid following exercise, and to substances introduced into the circulation that increase the hydrogen-ion concentration in the blood.

[5] The data and computations employed above are in the nature of the subject necessarily rounded and approximate only. The argument is directed to movements and trends rather than to measurements of an exact nature.

[1] From the Department of Cardiovascular Diseases, Beth Israel Hospital.

In fact, the rate and depth of breathing are regulated by the amount of carbon dioxide which reaches the respiratory center in a given time. Hyperpnea and dyspnea are common features in heart failure, due primarily to a slowing of the circulation in the lungs with deficient elimination of carbon dioxide.

Besides, the respiratory center receives peripheral stimuli from sensory nerves of the skin as well as from the nerve terminals in the heart muscle and in the lungs. It may also be affected by changes in intracranial pressure or by vascular disturbances in its vicinity.

Hyperpnea, or air-hunger, implies an increase in the rate and depth of respirations.

With orthopnea the patient assumes the upright position of the trunk, any attempt to lie down being immediately followed by an increase in respiratory distress. It is attributable to resistance to the full pulmonary ventilation offered by the abdominal contents pressing against the diaphragm. The hydrostatic effect of the erect posture on the blood content of the abdomen and the peripheral vessels is also a factor.

Cardiac asthma is of various types and presents different degrees of severity. It occurs in a variety of conditions and apparently results from some specific stimulation of the respiratory center. Cardiac asthma is used to include Cheyne-Stokes breathing and the attacks of air-hunger that occur with myocardial disease.

Classification

It will thus be seen that the respiratory symptoms in cardiovascular diseases may result from four entirely distinct mechanisms:

1. Stimulation of the respiratory center by toxic products, excess of carbon dioxide, or non-volatile acids in the systemic circulation.
2. Irritability of the respiratory center from a deficiency of oxygen due to impaired circulation—deficient transference of blood mass.
3. Nervous-reflex mechanism from a lesion in the myocardium or aortic-coronary area, as well as from peripheral pain.
4. Intracranial alterations of pressure or disease of the cerebral vessels.

Corresponding to these mechanisms different forms of respiratory distress may be induced. These may be classified as follows:

1. Of pulmonary origin.
   - *a.* Congestive or simple mechanical dyspnea.
   - *b.* Attacks of stasis or pulmonary asthma.
   - *c.* Pulmonary edema.
2. Of cardiac origin (spontandyspnea or grosskreislaufdyspnea of Wassermann).
   - *a.* Paroxysmal or spontaneous dyspnea.
   - *b.* Cheyne-Stokes breathing.
   - *c.* Cardiac asthma.
   - *d.* Uremic asthma.
3. Of cardio-reflex origin.
   - *a.* Cardiac asthma with angina pectoris, coronary thrombosis, and myocardial degeneration.
4. Of cerebral origin.
   - *a.* Periodic dyspnea with intracranial disease.
   - *b.* Cerebral arteriosclerotic asthma.

There are two conditions, quite individual in their pathogenesis, that have been confused in the literature under the name "cardiac asthma." In one of these (Group 1 above), the symptoms are essentially those of pulmonary congestion associated with attacks of dyspnea and wheezing, brought on often after exertion. The other forms of "cardiac asthma" (Groups II and III, above) depend upon factors in the arterial side of the circulation; *i.e.*, the left ventricle and its ability to maintain adequately the respiratory center in normal condition of blood supply and oxygenation.

Stasis or Pulmonary Asthma

The organic conditions underlying pulmonary stasis are usually stenosis of the mitral valve, auricular fibrillation, and the advanced valvular defects that develop with increasing heart failure. There is usually also venous and liver engorgement. This form of cardiac dyspnea is obviously a more or less chronic condition. During its progress exacerbations frequently occur in the form of paroxysmal attacks of dyspnea. For these attacks, I venture to suggest the term "pulmonary asthma."

Attacks of pulmonary asthma usually develop after strain or exertion beyond the patient's wonted capacity. The patient is

compelled to rest seated or quiet in the recumbent position, and shows both inspiratory and expiratory dyspnea, orthopnea, wheezing and a varying degree of cyanosis.

On physical examination there are wheezing, sibilant moist râles scattered over the lungs, usually with signs of congestion at the bases. There also is congestion of the liver and edema of the extremities. The vital capacity is in general much diminished and falls still further during the attacks of pulmonary asthma. The attacks may last only a short time, but often are much prolonged for hours or sometimes days. They may gradually subside, or, with increasing stasis, may end in pulmonary edema. Signs of valvular involvement are present, with accentuated pulmonic second sound. The pulse is usually rapid, small, compressible, and is often completely irregular. The blood pressure is low both in the intervals and during the attacks. Oxygen is of considerable benefit in these cases.

When the pulmonary circulation is overladen with dilatation of the pulmonary capillaries, the air or vital capacity of the lungs is naturally encroached upon, producing a constant predisposition to dyspnea. Finally, the dynamics of the right side of the heart are disturbed, and the venous system begins to contain more blood.

A high degree of pulmonary stasis may be produced without causing much or any increase in pulmonary blood pressure. Pulmonary hemoptysis is frequent in these cases. A diffuse or compensatory dilatation of the pulmonary capillaries takes place in response to mechanical obstruction to the outflow of blood from the lungs.

Paroxysmal Cardiac Dyspnea—Cardiac Asthma

Quite in contrast with pulmonary asthma, the main conditions in which spontaneous or paroxysmal dyspnea occurs are the aortic lesions and coronary arterial disease. The commonly associated lesions are those of arteriosclerosis, hypertrophied heart with hypertension, pulmonary emphysema and chronic interstitial nephritis—all evidence of extensive arterial change. Cardiac asthma seldom occurs in mitral insufficiency or in uncomplicated mitral stenosis. *Pulsus alternans* is especially frequent. Anginal pains are often present.

Paroxysmal dyspnea or cardiac asthma is a frequent symptom in cases of so-called cardio-renal disease in which there is a disturbed acid-base balance of the blood.

The following is a classical description of attacks of cardiac asthma:

"The patient may have gone to bed in his usual health and after a little sleep he is awakened with a feeling of suffocation, and an intense desire to breathe deeply. He sits up in bed and breathes in deep and labored fashion. A sense of great prostration may add to his suffering. Wheezing sounds may appear in the chest; he may cough up some frothy phlegm. The attack may last for half an hour or longer; then the breathing becomes quieter and he is able to lie down, though he keeps starting up and finally assumes a position with his head and shoulders raised, passing the remainder of the night in uneasy slumber. Once these attacks begin they are apt to continue and the nights of the patient often become of great distress."

The class of case which shows this condition most characteristically is the elderly person and those who suffer from arterial and cardio-sclerosis. They frequently have a high blood pressure, and the heart is usually regular except for the presence of occasional or frequent extrasystoles. In these cases we sometimes find the best examples of the *pulsus alternans*. In most cases this symptom is a very grave sign and usually indicates an exhaustion of the heart so extreme that only a very slight improvement can be hoped for. Similar attacks of breathlessness occur at the end of the apneic stage of Cheyne-Stokes respiration.

We may add that in every case of cardiac asthma, there is evidence that dyspnea on exertion has existed for some time preceding the sudden attacks of asthma. Attacks of angina pectoris or coronary thrombosis often recur in these cases.

The onset of the attacks is sudden, the face pale, and the distress great. During the attack, the pulse is usually full and of high tension; the blood pressure increases mainly as an effect of the muscular efforts induced by air-hunger.

On physical examination the signs of congestion are often absent, but there may occur a tracheo-bronchial wheezing or snorting due to stimulation of the vagus center. The great pallor during the attacks is due to stimulation of the vasomotor center.

The most recent and accepted conception of cardiac asthma is that it is a form of paroxysmal dyspnea which is due to a deficient arterial systemic circulation producing a central anoxemia. This is the crucial cause of dyspnea, and, in this sense, it covers the group of conditions in which the dyspnea is sudden in its onset, usually at night, spontaneous in its origin, paroxysmal in its recurrence, and in the usual attack does not go on to pulmonary edema.

Cardiac asthma is essentially a respiratory-center phenomenon, the result of increased sensitiveness of the center, produced by prolonged anoxemia.

The sequence of events producing attacks of paroxysmal dyspnea is as follows: The stimulus reaches the respiratory center through the arterial circulation; the center reacts in a specific way by a peripheral stimulus to the lungs; dyspnea develops, increasing the pulmonary ventilation and the heart rate. As a result, the irritability of the respiratory center lessens and the paroxysm of dyspnea subsides. If the ventilation of the lungs is inadequate, the dyspnea increases, at the same time stimulating the adjacent vital centers, particularly the vasomotor and vagus.

The vasomotor effect is a constriction of the peripheral arterioles producing marked pallor of the skin. The vagus effect produces constriction of the tracheo-bronchial musculature, increasing the mechanical efforts to breathe.

The outcome of an attack may be twofold: If the aeration does not become adequate, paralysis of the respiratory center may result and death suddenly ensues during the attack of gasping for breath. The second eventuality is heart failure. The left ventricle dilates as a result of the continued peripheral resistance

Dynamically, the left ventricle serves two purposes: (1) The filling of the systemic circulation, and (2) its diastolic effect is that of relieving the pulmonary circulation. It is the distinction between these effects that separates what I have called "pulmonary asthma" from cardiac asthma. Cardiac asthma is due to the propulsive weakness of the left ventricle.

The mechanism by which the attack subsides also implies this; the main effects of the attack being the transference of the

blood mass from the abdomen by vasoconstrictor action and by muscular movement.

Morphine lowers the irritability of the respiratory center, making it less sensitive to anoxemia. The value of nitroglycerine lies in the improvement of the cerebral circulation which results from widening of the intracranial vessels. Inhalation of carbon dioxide sometimes is beneficial, although the exact reason for the benefit is not known. The administration of oxygen in these cases does not give relief.

Relation of Angina Pectoris to Cardiac Asthma

In addition to the above theories, there is a reflex element as a factor in the production of these attacks. Usually an attack of angina pectoris with coronary thrombosis takes place first in these cases, producing left ventricular deficiency, and attacks of cardiac asthma are a later development. There exists a reflex mechanism between the aorta and the respiration. Irritation of the heart or aorta may produce respiratory phenomena such as spasm of the larynx and bronchi. The severe attacks of cardiac asthma resemble attacks of coronary thrombosis.

The dyspnea that is associated with angina pectoris can have two explanations: (1) That it is reflex in its mechanism, from the heart to the respiratory center and reflexly to the lungs; (2) that it is due to cardiac insufficiency.

Differential Diagnosis from Bronchial Asthma

Pulmonary and cardiac asthma are shown to be distinct entities. They are in no way related to essential or bronchial asthma. Pulmonary asthma and paroxysmal cardiac dyspnea frequently co-exist during the advance of myocardial degeneration.

Case 1.—Mrs. G. D., aged 39 years, suffered from dyspnea and palpitation and had a well-developed rheumatic mitral regurgitation and stenosis. She had had sudden attacks of cough, wheezing and hemoptysis, which recurred after excitement or exertion and were relieved by rest. These often continued for several days at a time both when the patient was awake and during sleep.

High-pitched and moist râles were found scattered over both lungs. These were attacks of pulmonary asthma.

The patient improved remarkably under digitalis medication so that the lung signs cleared and the vital capacity increased.

Case 2.—Mrs. B. K., aged 42 years, had mitral stenosis and auricular fibrillation. She had had periods of decompensation with moderate edema and pulmonary asthma for which she had to remain in bed for several days at a time.

In these attacks she was slightly cyanosed. The lungs showed scattered moist râles and dry bronchitic wheezing. The liver was enlarged and there was moderate pretibial edema. The vital capacity of the lungs was much below normal. The electrocardiogram showed right ventricular preponderance and auricular flutter which, under digitalis medication, changed to coarse auricular fibrillation.

At one time she had a sudden attack of burning pain and a sense of vise-like compression across the lower chest which soon diffused upward, radiating to the left pectoral region and both scapulae. This lasted ten minutes and left her very weak for several hours. The pain recurred together with attacks of characteristic cardiac asthma with gasping breath, dyspnea, orthopnea, wheezing, cough and expectoration.

Summary.—Long standing mitral stenosis; auricular flutter and fibrillation; repeated attacks of decompensation with pulmonary asthma; angina pectoris, recurring together with attacks of cardiac asthma.

Case 3.—A. G., aged 67 years, had for three years asthmatic attacks which occurred after exertion, with marked dyspnea and slight cough. In the attacks he panted for breath with a grunting sound.

The heart was obscured by emphysematous lung, and its sounds were not audible over the apex. The pulmonic second sound was louder than the aortic. There was a moderate arcus senilis and cyanosis of the mucous membranes. Blood pressure was 128/82 with *pulsus alternans*. The electrocardiogram showed marked arborization block and the QRS wave was widened to 0.14 of a second. Urine contained albumin and hyalin casts.

Summary.—Senile arteriosclerotic myocarditis; prodromal anginal symptoms; cardiac asthma.

Case 4.—J. S. M., aged 65, had an attack of coronary thrombosis five years before with acute pulmonary edema.

For two years he had suffered increasing dyspnea and at times slight cyanosis, both of which were relieved by oxygen inhalation and rest. In these attacks, often for days, the patient reclined on pillows or in a chair slightly cyanosed, dyspneic, wheezing and coughing. He developed considerable edema of the feet and legs and a moderate degree of ascites with the liver markedly enlarged. Heart was enlarged to left, the first sound weak. The urine showed albumin and casts.

During the past year, often when just about to fall asleep, he awakes with a feeling of bleathlessness for which he has to walk about or sit in a chair for perhaps fifteen minutes, and then again attempts to sleep. These are typical attacks of cardiac asthma.

Case 5.—M. R., 46 years old, gave a family history of "asthma." His father died of "asthma" at the age of 65, and one brother and paternal grandfather died of "asthma." At the age of 40 he had a sudden attack of vise-like pain in the chest with a severe gripping pain in the left elbow. This lasted a few minutes and recurred often with a sensation of suffocation and air-hunger. During the night he would awake with attacks of compelling dyspnea in which he had to get out of bed and stand supported against a wall, gasping for breath. These lasted a few hours and sometimes the entire night. He had no wheezing during the attacks. Often, when the patient fell asleep, he had typical Cheyne-Stokes breathing.

The patient had a sallow, pale complexion. His heart was enlarged both to the left and right, its apex seen and felt in the sixth space. At the apex, the sounds were weak and the first sound was of poor muscular quality. The pulmonic second sound was better audible than the aortic. Occasional ventricular premature beats occurred. The pulse was small and there was moderate cyanosis. The blood pressure varied between 102/90 and 98/64. The liver, with aggravation of the condition, became congested and extended down to the level of the navel, and moderate pretibial edema developed. The urine contained albumin and few hyaline and broad granular casts. The polygraphic tracings showed *pulsus alternans.*

The electrocardiogram showed low voltage, right ventricular preponderance; the P wave high, wide and notched in lead II; and the QRS wave was often of nodal origin and aberrant.

Summary.—Angina pectoris; chronic myocarditis; *pulsus alternans*; Cheyne-Stokes breathing; attacks of cardiac asthma.

Conclusions

There are, therefore, basically, two different forms of cardiac dyspnea. One depends upon the stasis in the pulmonary circulation associated with right ventricular deficiency, which I designate "pulmonary asthma." It also develops in the last stages of left ventricular failure. The other depends on deficiency of the left ventricle alone, with irritability of the respiratory center producing reflexly attacks of paroxysmal dyspnea or cardiac asthma.

A useful clinical classification is presented of the various forms of dyspnea in the course of heart disease, based upon the physiological mechanism of dyspnea.

Pulmonary asthma is distinguished from paroxysmal cardiac dyspnea or cardiac asthma.

The organic conditions underlying pulmonary asthma are the marked valvular defects that develop with increasing heart failure in the course of chronic myocardial disease or chronic valvular disease. These attacks are characterized by their onset after strain, with both inspiratory and expiratory dyspnea, wheezing, congestion at the bases of the lungs, and cyanosis. The vital capacity, previously below normal, is further diminished by stasis in the pulmonary capillaries. The condition may progress to pulmonary edema.

The main conditions in which paroxysmal cardiac dyspnea occurs are the aortic lesions and coronary artery disease; usually in elderly people. The attacks occur suddenly, commonly at night, with marked pallor, cold sweat and a feeling of anxiety or a suffocating oppression in the chest. The patient may jump out of bed, gasping for breath. They resemble attacks of coronary thrombosis. The dyspnea, marked pallor and the tracheobronchial wheezing are explained by stimulation of the respiratory, vasomotor, and the vagal centers in the brain respectively, by anoxemia due to insufficiency of the propulsive force of the

left ventricle (Wassermann). These attacks are relieved by morphine which depresses the respiratory center, or by nitrites which improve its circulation.

Pulmonary asthma and paroxysmal cardiac dyspnea frequently co-exist during the advanced stages of myocardial degeneration.

Cases are presented, illustrating both forms of cardiac dyspnea, with a statement of their differential diagnosis from bronchial asthma.

Section of Neurology and Psychiatry, April 12, 1927

THE MYASTHENIC SYNDROME

Presentation of Patient and Case Analysis

Charles A. McKendree

The patient presented this evening demonstrates the syndrome of Myasthenia Gravis in many respects. But it is a matter of interest that there are certain signs referable to an encephalitic etiology. I thought it worth while to present her because the onset was quite in keeping with our understanding of Myasthenia Gravis, the etiology and pathology of which are little understood. And yet, in this particular case there are signs, however slight, which I believe are sufficient to designate the syndrome as due to an inflammatory lesion of the central nervous system.

Patient: F. S. (Neurological Institute, No. A-12833-H.), aged 21, single, female, occupation—housework. Admitted October 18, 1926.

History:

Chief complaints: Marked fatiguability.

Date of onset of first symptom: February or March of 1919.

Character of the first symptom: General muscular weakness.

Onset—Slow and insidious.

Course—Progressive, then intermittent.

Present illness:

During the fall of 1918, the patient had a slight attack of influenza which kept her in bed for about one day, following which she seemed to be perfectly well. During February or March of

1919, the patient first began to experience generalized muscular weakness. Her first incapacitating symptom, after the onset of the gradual increase in weakness, occurred on March 1st while walking down the stairs; her knees gave way and she fell down. She attempted to get up and walk and felt weak and shaky. She went home, walking a distance of eight blocks, and during this walk she had to rest at about every block. She fell at least twice on the way home. Following the onset of the disturbance in February, she also noticed that while in school she could not read aloud as long as she could prior to this time and, in fact, she had to give up reading in one of the lower classes in school because she became so easily fatigued. She said that her tongue felt tense and that she could not bring out the words as she could before she became fatigued. After her falling experience on the stairs and going home she was forced to give up her gymnasium work because of the fact that she became so extremely fatigued upon any even inconsiderable exercise. At about this time the patient had been under a somewhat greater mental strain, as she was studying hard to graduate from school.

Following this onset the symptoms progressed over the course of the next two years until in the summer of 1921 she could take only a few steps across a floor and then would be obliged to hold the knees rigid in order to keep from falling to the floor. She could not feed herself on account of the weakness in her arms, her eyelids drooped, and she states that on account of the drooping of the eyelids she felt very sleepy. She would fall off to sleep if she lay down at any time of the day. It was extremely difficult for her to talk, she could swallow but very little and tired very easily.

Toward the end of that summer, while at a beach, she began to improve and she has never been in so bad a condition since, as she was during that summer. There has been, however, a continuation of the easy fatiguability, of the interference with reading, with swallowing and with her general activity which has varied during these years. The variation may be daily; one day she may feel considerably stronger and then the next day not nearly so capable of carrying on her duties. She reacts very well to rest and improves considerably if rest is enforced. She has no idea what days are going to be good days and the condition of weakness may come on in an hour or so.

During the summer of 1925 the patient spent her summer at the beach, and on one occasion felt unusually well so that she could run, jump and even walked a mile by herself. This remission was of very short duration and the rest of the day she felt about as before.

During the past few years her vision has tired very quickly and when she becomes tired she experiences double vision, the objects being apparently side by side. This condition clears up with rest. Usually when looking ahead the vision is not disturbed by any diplopia but when extremely tired the diplopia may come on even when looking straight ahead. For the same length of time she has noticed a rather decreasing ability to look to the side or up and down with any facility. Writing, walking, chewing, talking, in fact every act consisting of continued muscular effort has been greatly impaired due to this ready fatiguability. When very tired she has noticed that she may have a tremor about the lips.

In March, 1926, she was advised to have her tonsils removed and following this operation she staid in bed for 36 hours. On the next day she felt much stronger but later the weakness returned. Over the entire course of her illness the patient has noticed a decreased ability to learn and remember things. She has not been concerned or worried to any great degree about her difficulty.

PAST HISTORY:

Injuries and diseases: Between the ages of five and seven she was struck on the head with an icicle which cut her eye. Her tonsils were removed in March, 1925, under ether and she made a good recovery. She had diplopia in childhood, also measles and mumps. She is still said to have tonsilitis occasionally. She had malarial fever when a child and influenza in 1918. Her vision is good except for the fatiguability. Five years ago she slept from 8 P. M. to 11 A. M. When eight to ten years of age her mother said she had a habit of moving the mouth and lips.

PERSONAL HISTORY: The patient was in the 8th grade in school when she was fourteen years of age. She takes no tea or coffee, does not smoke or use drugs. She sleeps very well, perhaps her sleeping being pathologically increased. Her appetite is good;

she occasionally takes a little wine. Her bowels are constipated. Urination eight to ten times a day, none at night. Her periods are regular.

FAMILY HISTORY: The patient's mother and father are living and well; she has two brothers and one sister also living and well. The brother is nervous but the patient thinks this is from overwork. He is of the same general habitus as the patient and he used to see double but attributed this to eye weakness.

PHYSICAL EXAMINATION:

General Appearance and Coöperation: The patient coöperates perfectly within the extent of her ability to do so muscularly. She presents a somewhat peculiar appearance; the eyes are slightly prominent and do not seem to be exactly the same axis; if anything, the right seems to show a very slight divergent strabismus. There is at times a definite widening of the palpebral fissures of both eyes and the appearance of a transient exophthalmos. She does not appear to be acutely or chronically ill, but there is at the same time an appearance of fatigue in the facial expression.

Abnormal Attitudes and Deformities: None other than the peculiarities mentioned under the general appearance.

Gait: The gait is normal for the first few steps but then becomes halting and that of a much fatigued individual. These peculiarities are brought out upon the other tests for the gait. The associated movements of the arms, head and trunk are present but reduced in extent.

Coordination: The patient is right-handed.

Equilibratory: The patient stands well with the feet together, with the eyes open and closed, and also on one foot, but has some difficulty in maintaining her balance, not sufficiently, however, to be pathological.

Non-equilibratory: The finger to nose test is normally performed as is also the finger to finger test. The finger to thumb test is well performed but she tires very rapidly. The past-pointing test is poorly done on account of the muscle disturbance but she shows no constant lateral deviation. The tests of the lower extremities are well performed the first few times but become imperfect if continued. Succession movements are poorly

performed chiefly on account of the recent weakness which affects the cheek element.

Skilled Acts: She writes well, the speech is normal except upon continued effort when the expulsive effort becomes much weaker, the voice becomes husky and the sounds somewhat indistinct.

Abnormal Involuntary Movements: None were noted, except for occasional protrusion and retraction movements of the tongue.

Reflexes deep	Left	Right
Pectoral	2+	2
Biceps	2+	2
Radial	2	2
Triceps	2	2
Ulnar	2	2
Wrist	2	2
Hamstring	2	2
Suprapatellar	2	2
Patellar	3	3
Achilles	2	2
Periosteal, Cr.	0	0
Periosteal, Uncr.	P	P
Superficial		
Upper lat. abdom.	0	0
Lower lat. abdom.	0	0
Plantar flexion	0	0
Hoffman's sign	0	0
Babinski	0	0
Chaddock	0	0
Oppenheim	0	0
Gordon	0	0
Schaefer	0	0

Muscle Strength: The muscle power throughout is poor except possibly in the musculature of the forearm and the hands where the grasp is well maintained for a short time, then it fatigues. The muscles of the shoulder girdle are quite weak, being unable to withstand any considerable pressure. The same is true of the muscles of the hip and pelvic girdle, while the extensors of the leg on the thigh are good for a brief period and then they readily fatigue. In testing the forearm muscles she clasped and unclasped her fist ninety times in succession without any very marked fatigue. The effort, however, was not very active.

Muscle Status: The muscle tone is rather poor, the muscles throughout being rather soft and flabby.

Electrical Reactions: The electrical reactions showed the normal excitability to faradic current, and the correct polarity in the galvanic reaction was present and for all muscles tested. Faradic stimulation showed maintenance of tetanic contraction with application of the faradic current. It is thought that after forty consecutive stimulations the left ulnar nerve musculature showed some signs of fatigue. In none of these muscles was there the typical myasthenic reaction.

Abnormal Associated Movements: There were none.

Meningeal Irritation: Negative; no Kernig.

Sensory Examination: The sensory examination was normal throughout.

Cranial Nerves:

Olfactory Nerve: The patient recognizes and names alcohol and vinegar readily.

Optic Nerve: The visual acuity is normal in both eyes; the fields are complete and the fundi are normal although the discs are somewhat oval vertically.

Oculomotor Apparatus: The pupils are equal, measuring 5 mm. each in diameter, round and regular in shape, central in position. They react to light, both direct and consensually normally, and the reaction to convergence and accommodation is only fair in both eyes, as there is a slight transient exophthalmos in both eyes which is greater in the left than in the right eye. There is a slight external strabismus which adds to the peculiar expression supplied by the exophthalmos. The movements of the eyes are very much restricted. The movement of the right eye to the right is very poor; there is almost no upward or downward movement in the right eye. The movement of the right eye inward is good; this same thing is true of the left eye but to a less extent. There is no definite nystagmus. The palpebral fissures are unequal, the left being greater than the right. At times there is a tendency to a ptosis.

Trigeminus Nerve: Normal in the motor and sensory divisions.

Facial Nerve: The movements of the facial muscles in expression are rather reduced; there is no definite weakness in the voli-

tional control except upon continued use of the facial muscles.

Acoustic Nerve: Normal.

Glossopharyngeus and Vagus Nerves: Normal.

Spinal Accessory Nerve: Normal.

Hypoglossus Nerve and Tongue: Normal except for the fatiguability evidenced in the muscles of phonation and deglutition. The tongue protrudes up the midline but the movement of the tongue becomes weakened upon continued exertion. There are occasional protrusion movements observed.

SYSTEMIC EXAMINATION:

Tegumentary System: Normal.

Glandular Status: No apparent increase in the size of the thyroid, nor any indication of persistence of the thymus. The tonsils have been removed and there is no lymphadenopathy.

Cardiovascular Status: The pulse rate is quite variable, between 78 and 120 beats per minute. There is a considerable *sinus arrhythmia* which may account for the marked variations which are noted in the pulse rate; there are no murmurs heard and the heart is normal in size and outline. Blood pressure 110/68.

Respiratory System: The respirations rate varied 18 and 20, no abnormalities being noted.

Gastro-intestinal System: Normal.

Genito-urinary System: Negative.

Skeletal System: Normal.

Mental Status: Normal.

LABORATORY EXAMINATIONS:

Blood:	Hemoglobin	75 per cent.
	Color index	.95
	R. B. C.	3,900,000 per cubic mm.
	W. B. C.	7,200 " " "
	Neutrophiles	70 per cent.
	Small lymphs	28 " "
	Large monos.	2 " "
	Wassermann	negative.
	Urea	26 mgs. per 100 cc. of blood
	Urea N.	12.1 " " " " " "
	Sugar	.083 per cent.

Spinal Fluid

	Color	clear
	Pressure	normal
	Cells	6
	Globulin	—
	Wassermann	negative
	Colloidal gold	negative
	Protein	28 mgs.
Urine:	Color	light amber
	Reaction	acid
	Sp. gr.	1020
	Albumin	0
	Sugar	0
	Indican	0
	Pus cells	few leucocytes
	Epithelia	squamous
Basal metabolic rate		+8

X-ray Examinations: Examination of the thorax shows a slightly-increased shadow in the superior mediastinum with a very slight deviation of the trachea to the left. The apices are clear. The increased shadow noted may be due to a persistent thymus gland, although the shadow is not characteristically shaped.

Examination of the skull shows nothing remarkable about the calvarium. The circulatory channels are normally visible as are also the convolutional digitations. A small deposit of calcium is noted in the pineal gland. The basal angle is normal. The sella is shallow, somewhat angular but not wide open. Petroclinoid bridging is beginning to form on the left. The air cell development appears normal.

This patient has a history of a very slight infection antedating the appearance of symptoms by a few months. She had drowsiness two years later. There have been characteristic remissions in symptoms. We see her now eight years after the onset, in what she maintains to be a better condition than that of six years ago.

The protrusion and retraction movements of the tongue which we have observed here to-night are seen in post-encephalitic cases, but never, in my experience, in the classical cases of myasthenia gravis. These, combined with the history of infection, drowsiness and a generally maintained improvement in recent years, impress me with the probability of an encephalitis being the etiological factor in this case.

HOW YOUNG DOCTORS SHOULD BEHAVE[1]

CHARLES L. DANA

Gentlemen:

You may have heard the story of the young medical graduate. Soon after he had received his diploma, a friend said: "Well, doctor, are you going to get married or are you going to practice medicine?" "Why, sir," he replied, "I think that the latter course will be the safer one."

I do not wish you to feel that I have any bias in favor of this answer or of one implying an opposite standpoint. Perhaps, after all, the safest form of personal activity on the part of you graduates would be to follow both pursuits. If there is *danger* in each of them, there would seem to be just now a feeling that *danger* is a distinct advantage in a man's career. This is evidently an epoch for heroes, of heroes with a capital "H." For now the hero not only does great deeds, but always has his picture on the front page, and greatly increases newspaper circulation. Heroism is certainly a commendable thing. It is, in my opinion, however, much more common and less dramatic than is being made out just now. Heroism involves courage, skill, daring and initiative. It seems that all these qualities are needed, or may be employed in the career you have chosen. I wish you may have a good share of them all, and that a quiet, unexploited heroism may be part of your lot.

There is a great deal of lament expressed nowadays over the fading away of the general practitioner and especially of the country doctor. Medical men want to be near a hospital and a

[1] Address to the Fourth Class Students, Cornell Medical College, 1927.

laboratory and some teaching institution, and they want to be where doctors come together, not to quarrel, but to stimulate each other's interest and keep in touch with medical progress. This is a natural state of mind. It shows itself very concretely in medical students. All of those whom I meet now and question say that they are "going to stay in New York." They are not sure whether they will get married or practice medicine, but of this they are sure, they are going to stay in New York. Personally I am not quite so sure that they are. Flying and the automobile have made the country doctor able to live in a large city or town and still look after the rural sick. Now that the heroes of aviation have exploited their profession, one can feel somewhat assured that commercial aviation is coming to pass; then the doctor will have a flying machine with which to make his rounds. You may all be good country doctors, yet be able to fly down here to New York every week, hear a lecture and see what is going on in the clinic, or pass an evening at a meeting in the New York Academy of Medicine.

So I say here, gentlemen, marry, practice medicine, and learn to fly. Here is strength to your vestibular nerve!

I am sure you have been told many times how you ought to behave when you are physicians. It is all put down in the Oath of Hippocrates, which you ought to hang in your office and keep in the lining of your hat.

Medical men, perhaps, have to look after their behavior more seriously than any other class. The practice of medicine is *three-fourths behavior, i.e.,* of knowing how to manage people, and only *one-fourth technique.* Trained physicians have wondered how it happened that for over a generation homeopathy was the most successful form of medical practice socially and commercially in New York City! The reason of this I happen to know, because I saw and was part of the phenomenon. It was because the homeopaths were better dressed and had better manners. Not having any asset in the shape of scientific knowledge or therapeutic skill they had to, and did, fall back on a faultless etiquette. We have learned, I think, something from them. Ladies do not like shabby clothes and careless manners. They will select the doctor who is presentable over one who is unpresentable—and it is the women who decide as to who will be the family doctor.

Now that I am on the subject of the theory of human medical conduct, I want to read you a certain document which shows the point of view of the East Indian on this subject as given long before the time of Hippocrates. It is shown in a document known as

"THE OATH OF THE HINDU PHYSICIAN"

"You must be chaste and abstemious, speak the truth, not eat meat. Care for the good of all living beings, devote yourself to the healing of the sick even if your life be lost by your work. Do the sick no harm. Not even in thought, seek another's wife or goods. Be simply clothed and drink no intoxicant, speak clearly, gently, truly, properly, consider time and place, always seek to grow in knowledge.

"Do not treat women except their men be present, never take a present from a woman without her husband's consent.

"When the physician enters a house accompanied by a man suitable to introduce him there, he must pay attention to all the rules of behavior in dress, deportment and attitude. Once with his patient, he must in word and thought attend to nothing but his patient's case and what concerns it.

"What happens in the house must not be mentioned outside, nor must he speak of possible death to his patient, if such speech is liable to injure him or any one else.

"In face of Gods and man, you can take upon yourself these vows; may all the Gods aid you if you abide thereby; otherwise may all the Gods and the Sacra before which we stand be against you, and the pupil shall consent to this, saying, so be it."

Let me add to this rather strenuous document a few words of personal advice. When you get to your work, do not quarrel or speak ill of your fellow-workers and competitors. Try to find some nice things to say about them. This is that part of professional life which, as Cicero said, brings you nearer to the gods.

In conclusion let me make a suggestion gained from a rather long experience.

Do your work and study your cases intensely; make it the real and leading interest of your life; but have a *recreation* as well as an *avocation*. I do not say have a "hobby," I do not like that

word; it means a dominance of feeling over judgment; but have an *interest* that is non-professional. Be a collector, for example, of stamps or automobiles, or old books, or neckties or pins; or find diversion in some collateral branch of science; the lore of birds, of fishing, and shooting. Make a garden or cultivate shrubs and flowers. These kinds of activities will make your life happier and your professional character more attractive and effective. Love and learn a little poetry and keep also in your pocket or hanging on the wall these words:

"The Set of the Sail"

"One ship drives east and another drives west,
With the selfsame winds that blow,
'Tis the set of the sails
And not the gales
Which tell us the way to go.

"Like the winds of the sea are the winds of fate,
As we voyage along through life.
'Tis the set of the soul
That decides the goal
And not the calm or the strife."

It may seem to you rather curious that I should say in conclusion that you should be "religious." I do not mean that you should join a church, as some do, in order to get larger social relations and thereby increase their practice. I mean that the religious feeling is one of the instinctive attributes of man, as most people must realize, and as Henry Rutgers Marshall has very logically demonstrated in his work, "Instinct and Reason."

A capacity for religious feeling is one of the essential attributes of a normal and veritably well-rounded character—and he who ignores it cripples his personality. I advise you to cultivate this type of feeling just as you would cultivate, with less real benefit, your muscular efficiency and your various organic functions.

You are graduates of an unsectarian university, and religious forms, as I understand, are not encouraged here, but your regular classical work does not, I hope, exclude a desire for a reverent attitude and some personal reaction toward that extraordinary power which develops "star dust" into man.

LIBRARY NOTES

RECENT ACCESSIONS

Blakemore, A. W. National prohibition. The Volstead act annotated. 3. ed.
Albany, Bender, 1927, 1047 p.

Braun, H. & Goldschmidt, R. Die Methoden der tierexperimentellen Wundinfektionen.
Berlin, Urban, 1927, 67 p.

Brodhead, G. L. Approaching motherhood. 3. ed.
New York, Hoeber, 1927, 193 p.

Burgdorf, A. Der Sinus pericranii.
Leipzig, Vogel, 1927, 175 p.

Calmette, A. La vaccination préventive contre la tuberculose.
Paris, Masson, 1927, 250 p.

Christeller, E. Atlas der Histotopographie gesunder und erkrankter Organe.
Leipzig, Thieme, 1927, 88 pl.

Ciasca, R. L'arte dei medici a speziali nella storia e nel commercio Fiorentino dal secolo XII al XV.
Firenze, Olschki, 1927, 811 p.

Conklin, E. S. Principles of abnormal psychology.
New York. Holt, 1927, 457 p.

Cova, F. Toracoscopia: operazione di Jacobaeus.
Milano, Ceretti, 1927, 232 p.

Daniélopolu, D. L'angine de poitrine et l'angine abdominale.
Paris, Masson, 1927, 443 p.

Dawes, C. R. The Marquis de Sade. His life and works.
London, Holden, 1927, 240 p.

Deaver, G. G. Physical examination.
New York, Asso. Pr., 1927, 112 p.

Deschamps, A. & Vinchon, J. Les maladies de l'énergie. 3. éd.
Paris, Alcan, 1927, 423 p.

Earp, J. R. The student who smokes.
Yellow Springs, Ohio, Antioch Pr., 1926, 61 p.

Fleischmann, S. Plötzliche und akute Erkrankungen des Nervensystems.
Berlin, Karger, 1927, 301 p.

Fornero, A. Contributo alla cura operativa vaginale del prolasso del l'útero.
Modena, Tipo. Immac. Concez., 1926, 106 p.

de Gironcoli, F. Contributo alla chirurgia del rene e del l'uretere.
Bologna, Canpelli, 1927, 130 p.

Goal (The) of social work . . . Ed. by R. C. Cabot.
Boston, Houghton, 1927, 234 p.

Guyer, M. F. Being well-born.
Indianapolis, Bobbs-Merrill, 1927, 290 p.

Handovsky, H. Grundbegriffe der Kolloischemie. 2 Aufl.
Berlin, Springer, 1927, 64 p.

Harris, J. W. & Lacey, E. V. Everyday foods.
Boston, Houghton, 1927, 512 p.

Hegner, R. Host-parasite relations between man and his intestinal protozoa.
New York, Century Co., 1927, 231 p.

Herrman, G. R. Clinical case-taking.
St. Louis, Mosby, 1927, 90 p.

Howell, W. H. A text-book of physiology. 10. ed.
Philadelphia, Saunders, 1927, 1081 p.

Jackson, C. Bronchoscopy and esophagoscopy. 2. ed.
Philadelphia, Saunders, 1927, 457 p.

Jacot, M. Glycogène, adrénaline et insuline.
Paris, Masson, 1926, 209 p.

von Jaschke, R. T. Physiologie, Pflege und Ernährung des Neugeborenen. 2. Aufl.
München, Bergmann, 1927, 522 p.

Kleinschmidt, O. Chirurgische Operationslehre.
Berlin, Springer, 1927, 1269 p.

Koppel, I. Der Bau der Atome und das periodische System.
Leipzig, Voss, 1927, 174 p.

Korschelt, E. Regeneration und Transplantation. Vol. 1.
Berlin, Borntraeger, 1927.

La Croix, P. History of prostitution. 3 vols.
Chicago, Covici, 1926.

Lees, D. Practical methods in the diagnosis and treatment of venereal diseases.
New York, Wood, 1927, 605 p.

Levine, M. An introduction to laboratory technique in bacteriology.
New York, Macmillan, 1927, 149 p.

Lustig, A. & Vernoni, G. La febre ondulante.
Torino, Unione tipo.—ed., Torinesa, 1927, 140 p.

Martin, A. J. The activated sludge process.
London, Macdonald, 1927, 415 p.

Michelson, A. A. Studies in optics.
Chicago, Univ. of Chicago Pr., 1927, 176 p.

Mink, P. J. Sur les fonctions de l'oreille interne.
La Haye, Nijhoff, 1927, 82 p.

Minkowski, M. L'état actuel de l'étude des reflexes.
Paris, Masson, 1927, 75 p.

Morse, N. C. Emergencies of a general practice. 2. ed.
St. Louis, Mosby, 1927, 541 p.

Mossis, R. T. Editorial silence.
Boston, Stafford Co., 1927, 256 p.

Moulonguet, A. Les vertiges labyrinthiques.
Paris, Masson, 1927, 165 p.

Nassauer, M. Doktorsfahrten von Gestern und von Heute. 3. Aufl.
Stuttgart, Enke, 1926, 169 p.

Newsholme, Sir A. Evolution of preventive medicine.
Baltimore, Williams, 1927, 226 p.

Noël, A. La chirurgie esthétique.
Paris, Masson, 1926, 84 p.

Norris, G. W., Bazett, H. C. & McMillan, T. M. Blood-pressure. 4. ed.
Philadelphia, Lea, 1927, 387 p.

Piccoli, G. Sindromi nervose organiche consecutive a lesioni del cervello per ferite di guerra.
Fano, Tipo. Sonciniana, 1926, 156 p.

Price, G. M. Hygiene and sanitation. 5. ed.
Philadelphia, Lea, 1927, 282 p.

Radovici, A. Études sur la circulation de l'influx nerveux dans l'arc réflexe.
Paris, Masson, 1927, 107 p.

Ranson, S. W. The anatomy of the nervous system. 3. ed.
Philadelphia, Saunders, 1927, 425 p.

Redi, R. Le affezioni delle borse sierose.
Castello, Soc. tipo. L. deVinvi, 1926, 124 p.

Rehfuss, M. E. Diagnosis and treatment of diseases of the stomach.
Philadelphia, Saunders, 1927, 1236 p.

Reich, W. Die Funktion des Orgasmus.
Leipzig, Internat. psych. Verl., 1927, 206 p.

Richardson, D. L. Infectious diseases and aseptic nursing technique.
Philadelphia, Saunders, 1927, 182 p.

Sack, A. Hippokrates.
Berlin, Springer, 1927, 87 p.

Sadler, W. S. The truth about heredity.
Chicago, McClurg, 1927, 512 p.

Scalone, I. Le lesioni traumatiche del cervello e cervelletto.
Milano, Soc. ed. unitas, 1927, 305 p.

Sicard, J. A. & Gaugier, L. Le traitement des varices par les injections locales sclerosantes.
Paris, Masson, 1927, 100 p.

Sinel, J. The sixth sense. A physical explanation of clairvoyance, telepathy, hypnotism . . .
London, Lowrie, 1927, 180 p.

Sluder, G. Nasal neurology, headaches and eye disorders.
St. Louis, Mosby, 1927, 428 p.

Stevens, A. A. A text-book of therapeutics. 7. ed.
Philadelphia, Saunders, 1927, 758 p.

Többen, H. Neuere Beobachtungen über die Psychologie der zu lebenslänglicher Zuchthausstrafe verurteipten oder begnadigten Verbrecher.
Leipzig, Deuticke, 1927, 194 p.

Todd, J. C. & Sanford, A. H. Clinical diagnosis by laboratory methods. 6. ed.
Philadelphia, Saunders, 1927, 748 p.

Transactions of the American association of obstetricians, gynecologists and abdominal surgeons. 1926.

Transactions of the Southern surgical association. 1926.

United States. War dep't. S. G. O. The medical department of the United States army in the World war. Vol. ii. Administration American expeditionary forces.

United States, Gov. Pr., 1927, 1123 p.

Wadsworth, A. B. Standard methods of the division of laboratories and research of the New York State department of health.
Baltimore, Williams, 1927, 704 p.

Webster, R. W. Potassium and tartrates.
Chicago, Commonwealth Pr., 1927, 168 p.

Weigert, F. Optische Methoden der Chemie.
Leipzig, Akad. Verlag., 1927, 632 p.

Wenckebach, K. F. & Winterberg, H. Die unregelmässige Herztätigkeit. 2 vols.
Leipzig, Engelmann, 1927.

Whitman, R. A treatise on orthopedic surgery. 2. ed.
Philadelphia, Lea, 1927, 1061 p.

Wolbarst, A. L. Gonococcal infection in the male.
St. Louis, Mosby, 1927, 237 p.

Wolf, H. F. Strategie der männlichen Annäherung.
Wien, Ilos Verl., 1926, 325 p.

Woods, E. A. America's human wealth.
New York, Crofts, 1927, 193 p.

Zaniboni, A. Patologia chirurgica delle resezioni e delle esclusioni intestinal.
Padova, Soc. annon. tipo., 1926, 592 p.

Zimmerman, R. Die Schwangerschaft ausserhalb der Gebärmutter.
Leipzig, Thieme, 1927, 85 p.

ANNOUNCEMENT

At the time of the opening of the new building last November an exhibition of "Early and Later Medical Americana" was arranged by the Exhibits Committee. A catalogue of this, containing twenty illustrative plates and many biographical and bibliographical notes, has now been printed. Those who are interested may obtain a copy in the Library.

IN MEMORIAM: DR. THOMAS W. SALMON[1]

The history of events is the history of men. The great body of men in any group—political, military, social, or be it professional, such as medicine, law, theology, education—contributes not a great deal to events. No professional group can rise much above the median of the general population; its intelligence, its culture, its emotional hindrances cannot be much above the general group from which it comes and in which it lives. Many must be dull, many must be routinists and time-servers, carrying on by rote what they have learned from their preceptors. There can be few —for any given time there are few in any general population— who have qualities so combined as to make it possible for them to change the current of events in any large way. This does not mean that they are unimportant. The integrity of a group or profession is dependent upon them, and the social value of the group is to be measured not by the occasional "biological sport," if you will, who is not representative of the whole, but by the average of the units composing the group. Each contributes his part in the maintenance of the group or profession, and the group as a whole may change mightily the course of social events, although the group moves across time as a sluggish river. However, events or change of current within the group, or even events or change of current in the relation of the group to contiguous territory or other groups, are made by men, in any given instance by a man, one who in his personality and character possesses a combination of qualities which we always recognize as rare. In the field of science those who have changed events have had intelligence and imagination—Virchow, Pasteur, Wassermann, Kraepelin, Freud, Starling, Darwin, Einstein, Millikan. Many men have intelligence, but not a few are unable to use the rare intelligence they have because of emotional handicaps. Many with intelligence lack imagination; many have imagination so unbridled as to be a pitfall; only a few in any given generation have intelligence and imagination combined in such a way as to cause them to stand out as more effective than their fellows. Through them events take place, history is changed, and man continues his conquest of the world and his own development.

[1] Delivered before the Section of Neurology and Psychiatry, October 11, 1927.

In those fields which combine science with living, which, if you will, relate science to life, represented by several professional groups, but by none more importantly, perhaps, than medicine, a still rarer combination of qualities is necessary—intelligence, imagination, and fine feeling. It is the latter that is the stumbling block. A hair may disturb the delicate balance when one is to weigh the quality which we can only name as fine feeling, sensitiveness, or a certain sensitiveness to living. A hair's weight too much, too little—the danger is greatest perhaps that it will be too much and change sentiment into sentimentality—and the combination is lost for greatest effectiveness. When occasionally this combination appears in an individual, that individual influences events that ten thousand men without this special combination of qualities cannot change.

I do not believe that under the circumstances of my writing I stress these qualities because Salmon possessed them; I believe I have been objective in arriving at them only to find that he had them. But whether or no, they were the qualities that are in evidence throughout all his work—in private practice, in the state hospital, in the Public Health Service, in the manifold activities of The National Committee for Mental Hygiene, in the psychiatric work of the Army, in the work of the Veterans' Bureau, in the planning of the new psychiatric center at Columbia University—qualities which made his work so strikingly effective, and made it possible to influence the course of events in American medicine, in the field of psychiatry and in contiguous social fields. They were the qualities, too, which tied men to him in a fine and close personal relationship.

Dr. Salmon, on receiving his diploma from the Albany Medical College in 1899, began his work as a private practitioner at Brewster, New York. Ill health developed and it was necessary for him to spend some time in the Adirondacks recuperating. Following his return to health, he entered the New York State Hospital Service as an assistant physician at the Willard State Hospital. This turned out to be an important step in his life, not only in that it gave him his first contact with psychiatric problems, which later came to be his main interest, but that it brought him in touch with Dr. William L. Russell, who at that time was also a member of the staff of the Willard State Hospital. A

friendship and professional relationship developed which continued throughout Dr. Salmon's life, and influenced in many ways his subsequent career. It is not generally known, perhaps, that during his period at the Willard State Hospital, Dr. Salmon studied a diphtheria epidemic that developed there and published two papers in regard to it. Probably because of his experiences in this epidemic, he seems to have become more interested for the moment in epidemiology than in psychiatry, and in 1903 he entered the United States Public Health Service. Here, however, he found other problems than those of epidemiology to challenge him—the neglect of deep-sea fishermen, for whom he advocated a hospital ship, which was eventually obtained; the problem of proper, even human care of insane immigrants held for deportation; the devising of methods for psychiatric examination of immigrants, and the like. Dr. Salmon contributed to other departments in the United States Public Health Service, but his chief service, perhaps, was in relation to the immigration service, to which he was assigned in 1905, and in this service to the examination and care of the insane. The time may not yet have come for writing the full history of the events of those days, and it is probably enough to say now that at that time, as a young man, he showed the same fearlessness and quiet courage, persistence and resourcefulness in the face of what would seem to be almost insurmountable obstacles, that he showed later as a mature man in meeting his part of the problems of a world crisis. Although he did not come off in this contest with indifference, bureaucracy and red tape the complete victor, he accomplished much, and his accomplishments were the beginning of the development of an adequate psychiatric service for immigrants at Ellis Island. This has meant much, both in the protection of immigrants, and in the protection of the country against the entrance of immigrants who, because of their mental condition, would become dependent upon the charities of various states. So serious had this situation become—the dependence of insane immigrants upon public charities—that the state of New York, probably the greatest sufferer, appointed a board of alienists to study the matter and, in 1911, Dr. Salmon obtained leave of absence from the United States Public Health Service to become the chief medical examiner of this New York State Board. From his work with this Board developed important protective legislation.

In 1909 there had been formed in New York, through the effort of Mr. Clifford W. Beers, and the assistance of such men as Professor William James, Dr. Adolf Meyer, Dr. August Hoch, Dr. William Mabon, and Dr. William L. Russell, an organization known as The National Committee for Mental Hygiene. This Committee had as its plan the improvement of the care of the insane throughout the country. When the plans had been sufficiently matured to warrant the employment of a younger man to undertake certain studies for the Committee, a fund for the purpose having been obtained, the Committee turned to Dr. Salmon who, in the years just previous, in his work in the immigration service and with the New York State Board of Alienists, had shown the qualities of intelligence and courageous leadership that the work demanded, and in 1912, with leave of absence from the United States Public Health Service, Dr. Salmon undertook for The National Committee for Mental Hygiene a special study of hospitals caring for patients with mental disease. He continued on leave from the United States Public Health Service until 1915, when, adequate funds having been obtained for the work of the Committee, he resigned from the United States Public Health Service and became the first Medical Director of The National Committee for Mental Hygiene. He remained as Medical Director of the Committee until January 1, 1922, when he resigned to enter private practice, having been appointed in 1921 Professor of Psychiatry at Columbia University.

When one contemplates his accomplishments, it does not seem possible that in this period of years, 1912–1922, only five were devoted to laying foundations for the work of the National Committee, the other five having been devoted largely to war work of one kind or another. To be sure, the work during the war grew out of the work he had been doing and the foundations he had laid during the years 1912–1917, and the success of the work during the war reacted favorably in the subsequent development of the work he had previously planned. But it is not so much to the result I refer as to the amount of planning and getting under way that was accomplished during those five years, 1912–1917. There was nothing spectacular about that work. It did not attract great public attention as so many public health movements have done in their beginning. It

was solid, intelligent work that could have been planned only by one who sensed the significance of what he was doing, who saw clearly and looked well to the future. A library was established —not just a library, but a very special library. Not a collection of books that duplicated the shelves of almost any good public or medical library, but a library, carefully indexed, that held comparatively few books, but was rich in current reprints and extract material that had not been collected elsewhere. A Department of Hospital Service was organized to gather information in regard to the hospitals for mental disease in the country and to create a library of hospital plans, particularly of new constructions. A list of the public and private hospitals of the country was prepared; also a directory of the practicing psychiatrists and neurologists in each state and city, including an outline of their training. Methods were devised and forms prepared for the survey of state hospital systems and the general system by which states cared for their insane. At the request of governors, legislatures, and official boards, surveys were undertaken. Surveys in over thirty states have been made by the National Committee, most of these under Dr. Salmon's direction. In each survey recommendations were made looking toward the improvement of the care given to the insane, and in a more than gratifying number of instances these recommendations were carried out, or in large part carried out. A Department on Mental Deficiency was organized and a program devised for the identification, education and training, and, when necessary, proper segregation of the feeble-minded. The laws in the various states pertaining to the insane and the feeble-minded were compiled and published and an organization was created for collecting currently all new legislation upon these subjects. A Department of Uniform Statistics was created, and through the cooperation of the American Psychiatric Association a uniform nomenclature and a uniform method of statistical recording were adopted by hospitals for mental diseases throughout the country. For the purpose of studying the relation of mental disease and defect to delinquency, psychiatric clinics were established at Sing Sing Prison and the Juvenile Court of New York City and a psychiatric bureau at New York City police headquarters. This was not the first work that had been done in this field, previous work having been done

in Chicago by Healy and in Massachusetts by Stearns; but the work at Sing Sing was the first large study of its kind ever undertaken and from it has come much of the impetus that has carried forward similar studies since. In order that the layman might come to have a more intelligent and therefore more sympathetic understanding of the problems in the field of psychiatry, the quarterly journal, *Mental Hygiene*, was established.

These, of course, are not all of the activities that Dr. Salmon undertook as Medical Director of the National Committee, but they are sufficient to indicate the intellectual grasp he had of the problem he had before him and the large way he therefore went about organizing this new undertaking. As has been said, none of these things was spectacular, or designed to attract general public attention; each had importance in itself, but each was an integral unit in a whole; none gave large immediate returns, but each, as well as the whole, held potentialities for growth with increasing and sure effectiveness. Not many public movements are planned in this way. Other methods are usually preferred by young directors of new movements. Dr. Salmon's judgment in this matter was sound.

Two other major activities, probably the most important of his career, remain to be mentioned—his work during the war and the inception and carrying through of the plans for a psychiatric institute in connection with the new medical center at Columbia University. These, however, are so well known as to need here only briefly to be stated.

When one thinks of the general indifference to all psychiatric problems in 1917, it is little short of amazing what Dr. Salmon was able to accomplish. Not only was the general public uninformed, it was mostly misinformed in regard to the nature of war neuroses; the medical profession, largely as uninformed and misinformed as the lay public, held psychiatry in almost complete disregard—psychiatry was the Cinderella of medicine, as Dr. Salmon once phrased it—army officers were reared in a philosophy as alien as could be to the philosophy of conduct upon which the psychiatrist's work is based. What opportunity could there be for any work, let alone proper work, under such circumstances?

As is well known, Dr. Salmon was the Chief Consultant in Psychiatry in the American Expeditionary Force, and for his

services was awarded a distinguished service medal and was promoted to the rank of Brigadier-General in the Medical Officers' Reserve Corps. One can well believe that he was properly proud of these things, but one knows full well what this war service meant to Salmon—that more than 80,000 deemed unfit were not needlessly and dangerously exposed to war; that thousands of young men, for whom exposure was too great, to-day owe their health and effectiveness to timely treatment; that many hundreds, officers and men, found available the assistance they needed at a critical moment to make their war service effective; that thousands who, unfortunately, are not now and have not been since their service in good health, have been well cared for from the day they became ill; that the services of a well-trained psychiatrist are no longer disregarded, but are sought to an extent that for the moment is embarrassing because of the comparatively small number available; that psychiatric data and the psychiatric point of view have permeated not only an army, but a social structure and are producing a reconstruction in social thinking. This, one feels sure, is what the war service meant to Dr. Salmon.

The new psychiatric institute, an integral part of the new medical center at Columbia University, will now stand as the culmination of Dr. Salmon's work. Such a center had long been in his mind, a center in which the ablest men could work advantageously, where the highest standards of therapy could be maintained—one puts this first, for it was the patient that Salmon always had first in mind—clinical and laboratory research carried on, and personnel trained; and a center in proper mutual relationship to other medical specialties and laboratory sciences. Due in large part to his efforts, such a center is now in process of building, and psychiatry and medicine may look forward to an opportunity they have not had before, and the sick of the community to an increasing understanding of their difficulties and increasing ability to assist them.

Dr. Salmon would be the first to decline the credit for the success of these two undertakings, pointing to others who had a part in each. But those who had a part in either or both would be the first to say that it was Dr. Salmon's vision, inspiration, intelligent planning, and resourcefulness that made success possible. Many have had important work to do in each, but there is no question to whom credit belongs.

Dr. Salmon influenced the course of medicine and psychiatry in America. The qualities that made it possible for him to do this are, I believe, the qualities I named in the beginning—intelligence, imagination, and fine feeling, or a certain sensitiveness to life. He was an idealist, but he was not a visionary. He was a practical idealist, not in the sense that he would sell his ideals for a mess of pottage, for a cheap and temporary accomplishment, but because his ideals were practicable, frequently more practicable (economical and sensible)—as no one could demonstrate so well as he—than the unideal, so-called practicable, economical, business-like, and common-sense plans proposed in opposition to his. This type of idealist the world cannot well do without.

Dr. Salmon was drowned in August while sailing on Long Island Sound. There survive him his work, his wife, six sons and daughters, and men and women both within and without the medical profession who admired him, who were his friends and who followed confidently his leadership in mental hygiene and psychiatry. He gave much and generously to them all and they can only hope that he found in these associations, in his work and in life those things he needed to make living valuable to him.

FRANKWOOD E. WILLIAMS
THE NATIONAL COMMITTEE FOR MENTAL HYGIENE

Vita: Thomas William Salmon, born Lansingburg, New York, January 6, 1876; son Thomas H. (M.D.) and Annie E. (Frost) S.; M.D., Albany Medical College, 1899; married Helen Potter Ashley, of Lansingburg, Dec. 21, 1899; private practice and Willard (N. Y.) State Hospital, 1899–1903; commanding assistant surgeon U. S. Marine Hospital Service (now U. S. Public Health Service), October 29, 1903; passed assistant surgeon, 1908, resigned January 1, 1915; Chairman, New York State Board of Alienists, 1911; Director of Special Studies, The National Committee for Mental Hygiene, 1912–14; Medical Director, The National Committee for Mental Hygiene, 1915–21; staff, Rockefeller Foundation, 1915–21; Professor of Psychiatry, Columbia University, 1921–27; consulting psychiatrist, Presbyterian Hospital, 1922–27; Major, Lieutenant-Colonel and Colonel, M. C., U. S. A., 1917–19; Brigadier-General, M. R. C.; senior consultant in neuropsychiatry, A. E. F.; awarded Distinguished Service

Medal; editor, Neuropsychiatric Volume, A. E. F. Section (History), The Medical Department of the United States Army in the World War; member, Permanent Inter-Allied Commission for the After-Care of Disabled Soldiers; member, International Jury of Award, Panama-Pacific International Exposition; awarded Presentation Medal, National Institute of Social Sciences. Member, American Medical Association, American Institute of Criminal Law and Criminology, American Association for the Advancement of Science, New York Psychiatric Association (president), American Neurological Association, American Psychiatric Association (president), Association of Military Surgeons in the United States, Phi Sigma Kappa. Clubs: Century, Larchmont Yacht, Army and Navy (Washington, D. C.). Author of chapter on "Immigration," in *Modern Treatment of Mental and Nervous Diseases,* 1913; chapter on "Mental Hygiene," *American Year-Book,* 1917–20, and in *Preventive Medicine and Hygiene,* 1916–20, etc. Contributor on psychiatry and mental hygiene to magazines and scientific journals.

OBITUARY: DR. HENRY KOPLIK

Dr. Henry Koplik was born in New York City on October 2, 1859. He died in his 69th year on April 30, 1927, of myocardial insufficiency due to severe disease of the coronary arteries. At the time of his death there was no more distinguished pediatrician in America, nor one more widely known in the world.

His general education was obtained at the College of the City of New York, where he received the degree of A.B. in 1878. His medical studies were carried on at the College of Physicians and Surgeons (Columbia University), from which he was graduated in 1881. A short time after he completed his term of interneship at Bellevue Hospital he left for Europe, where he spent one and one-half years in study in Berlin, Prague, and Vienna. Of all the distinguished teachers under whom he studied in these places the one who most influenced him was Professor Alois Epstein, who

was Director of the Foundling Institution of the German University in Prague.

In 1887 he was made Attending Physician to the Good Samaritan Dispensary. At that time the departments of pediatrics and gynecology in that institution were combined. This explains why one of Dr. Koplik's first papers dealt with the value of massage of the uterus and adnexa. During many years of his connection with the Dispensary he also did research work in bacteriology and pathology at the College of Physicians and Surgeons (in the laboratory of Delafield) and at the Carnegie Laboratory. As soon as he saved a little money he maintained in the Dispensary a laboratory devoted to bacteriology and clinical pathology. He rapidly made so extraordinary a reputation that physicians from as far away as San Francisco came to study with him. In fact his international standing was obtained on the basis of his work at the Good Samaritan Dispensary.

In 1889 he established there the first of the now so well-known milk depots (*gouttes de lait*). This was an accomplishment of outstanding importance and significance.

After serving for some years as Adjunct Visiting Physician to the Children's Ward at Mount Sinai Hospital, he worked there for twenty-five years as Attending Pediatrician, and then became Consulting Pediatrician. While connected with that institution he carried on some of his later clinical studies, and put into effect his ideas on ward hygiene.

For a time he was Attending Physician to St. John's Guild. He was also consultant to the Hebrew Orphan Asylum, the Hospital for Deformities and the Jewish Maternity Hospital.

Dr. Koplik was one of the founders of the American Pediatric Society, and at one time President. He was a member of the Association of American Physicians and an honorary member of medical societies in Vienna and Budapest. A source of great gratification to him was his appointment as a member of the Permanent Commission of the International Association of Child Welfare and *gouttes de lait*.

His medical activities were greatly varied. He was not only interested in the clinic but also in pathologic and bacteriologic studies. The fundamental subjects of hygiene and child welfare occupied much of his thought. As a clinician he was a sharp

observer and an accurate recorder of his investigations. His ability to pick up a new differential diagnostic feature of a condition was at times quite uncanny. In his work in bacteriology (which engrossed him more than pathology) he was original and painstaking.

The publications made by him extended over a period of thirty-six years, 1887–1923. Some of the main subjects that occupied his attention were the etiology of empyema, uro-genital blenorrhea and the prevention of its spread in institutions, cerebrospinal meningitis (especially posterior basic meningitis), poliomyelitis (particularly cerebral involvement), diphtheria, sporadic cretinism, Mongolian idiocy, the prevention of the spread of respiratory and intestinal infections in wards, and the sterilization and pasteurization of milk. Other subjects to which he made contributions include streptococcus osteomyelitis, retropharyngeal abscess, pyloric spasm and congenital hypertrophic stenosis of the pylorus, chronic arthritis, pneumonia, typhoid fever and summer diarrheas.

Except for the subject of diphtheria no attempt will be made here to describe these contributions. The studies of diphtheria that were particularly important were those dealing with the cases of that disease which resemble catarrhal angina and lacunar tonsilitis. The recommendations of Dr. Koplik for the rapid bacteriological diagnosis of diphtheria are most valuable, as can be attested by the long experience of a number of observers, including the writer.

In 1897 he described a bacillus in pertussis which he had long before seen, and now had succeeded in cultivating. He stated that it resembled an organism described by Afanassjew. At that time differential immunologic methods were not available, and for that reason a strict comparison with the organism of Bordet-Gengou cannot now be drawn. The bacillus of Koplik seems, however, to conform to that of Bordet and Gengou.

In 1896 he published a paper entitled "The Diagnosis of the Invasion of Measles from a Study of the Buccal Mucous Membrane." This was followed in 1898 by a second paper on the same subject. The rapidity with which this method, so valuable from a diagnostic and epidemiologic standpoint, was accepted was remarkable. The full story of its speedy adoption will be given at

another time. While it was later pointed out that Flindt in Denmark, and Filatoff in Russia, had made observations similar to that of Dr. Koplik, the credit for its independent discovery and its popularization were freely given to him, and the sign at once named after him. The "Koplik Spots" made him justly famous the world over.

His book, "Diseases of Infancy and Childhood," appeared in 1902. It went through four editions, the last appearing in 1918. He dedicated it to his preceptors, Dr. Francis Delafield, the great clinician and pathologist, and Dr. Matthew D. Mann, who became the distinguished Professor of Obstetrics and Gynecology in the University of Buffalo, and who also came so prominently into the public eye because of his being called in to take care of President McKinley when he was shot. This volume of Dr. Koplik's contained large numbers of observations that he had not published in separate papers. Like all his publications the book is written in a careful, clear and concise way.

Personally Dr. Koplik was a man of distinguished appearance and dignified bearing. Whenever he discussed a presentation at a meeting, all eyes were at once turned to him, and all realized that they would hear a carefully-worded and authoritatively expressed statement based upon his own experience and his own views. In more intimate contacts one was impressed and attracted by his sparkling mind, his great knowledge and his goodly store of anecdotes and humorous stories. He was himself the kind of man concerning whom numerous anecdotes spring up. Some of these will no doubt be preserved.

It was many years before he developed practice and consulting work. His early career was a difficult one, but he had always the definite feeling that he would become a world figure in pediatrics. He was one of the first American practitioners to take up pathology and bacteriology, just as the celebrated Meltzer did extraordinary work in physiology while engaged in active family practice. Because of his interest in scientific pursuits, he early attracted the attention, admiration and support of such men as Adami, Jacobi, Osler and Welch. In the early part of his career he was very close to Jacobi. In fact, the latter entrusted to him much of the preparatory work for his classical monograph on diseases of the thymus.

It cannot be said that Dr. Koplik developed a school. He did, however, advise many men in their studies. A number of young physicians, including the writer, were inducted into the laboratory side of medicine by this remarkable man.

E. LIBMAN

DEATH NOTICES

EDWARD WALLACE LEE, M.D., 19 Center Street, Randolph, New York; graduated in medicine from the University of Michigan in 1882; elected a Fellow of the Academy, January 4, 1918; died, September 8, 1927. Dr. Lee was a Fellow of the American Medical Association and Consulting Surgeon to the Polyclinic and Broad Street Hospitals.

JACOB FUHS, M.D., 848 Prospect Place, Brooklyn, New York; graduated in medicine from the College of Physicians and Surgeons, New York City, in 1875; elected a Fellow of the Academy, April 5, 1888; died, September 18, 1927. Dr. Fuhs was a Fellow of the American Medical Association, a member of the Pathological Society, the Neurological Society, the Gastro-Enterological Society, and Consulting Physician to St. Mary's, Jamaica, Beth Deacon, Long Island College, Wyckoff Heights, St. Catherine's and the Jewish and Israel-Zion Hospitals.

EDWARD FLETCHER BRUSH, M.D., 320 South Fifth Avenue, Mount Vernon, N. Y.; graduated in medicine from Bellevue Hospital Medical College in 1875; elected a Fellow of the Academy, February 5, 1880; died, October 3, 1927.

FRANK SHERMAN MEARA, A.B., Ph.D., M.D., 400 West End Avenue, New York City; graduated in medicine from the College of Physicians and Surgeons, New York City, in 1895; elected a Fellow of the Academy, October 6, 1904; died, October 10, 1927. Dr. Meara was Professor of Clinical Medicine, Cornell University Medical College; a Fellow of the American Medical Association, and a member of the Society of Alumni of St. Luke's Hospital. He was Consulting Physician to the Bellevue, Lawrence, Bronxville, Mt. Vernon, Mountainside, Montclair and

Memorial, Morristown, St. Mary's, Orange, Dover and Overlook, and Summit Hospitals, and to the New York Infirmary for Women and Children.

WILLIAM ALEXANDER HUME, M.D., 63 Seasongood Road, Forest Hills, New York; graduated in medicine from the College of Physicians and Surgeons, Columbia University, in 1880; elected a Fellow of the Academy, June 7, 1888; died, October 19, 1927. Dr. Hume was a Fellow of the American Medical Association and a member of the Roosevelt Hospital Alumni Association.

JACOB TESCHNER, M.D., 134 East 61st Street, New York City; graduated in medicine from the College of Physicians and Surgeons, Columbia University, in 1880; elected a Fellow of the Academy, April 5, 1894; died, October 23, 1927. Dr. Teschner was a Fellow of the American Medical Association.

HERBERT SWIFT CARTER, A.B., A.M., M.D., 66 West 55th Street, New York City; graduated in medicine from the College of Physicians and Surgeons, Columbia University, in 1895; elected a Fellow of the Academy, March 16, 1905; died, October 25, 1927. Dr. Carter was a Fellow of the American Medical Association, and Consulting Physician to the Presbyterian, Lincoln and New York Skin & Cancer Hospitals.

HOLMES CONDICT JACKSON, Ph.B., Ph.D., 338 East 26th Street, New York City; graduated from Yale University in 1896 and 1899; elected an Associate Fellow of the Academy, January 6, 1910; died, October 25, 1927.

WILLIAM GILMAN THOMPSON, Ph.B., M.D., 17 East 61st Street, New York City; graduated in medicine from the College of Physicians and Surgeons, Columbia University, in 1881; elected a Fellow of the Academy, May 21, 1885; died, October 27, 1927. Dr. Thompson was a Fellow of the American Medical Association, a member of the American Physicians' Association, a member of the Alumni Association of New York Hospital, Presbyterian Hospital and Bellevue Hospital. He was also Consulting

Physician to the Bellevue, Woman's, Nassau, and the Lawrence and Reconstruction Hospitals.

SPECIAL NOTICE

Wanted—for publication—photographs of the following New York physicians of 1883:

Billington, C. E.	Livingston, Beverley
Bradley, E.	Monell, J. A.
Caldwell, R. A.	Pierce, H. T.
Chauveau, J. F.	Russel, C. P.
Chamberlain, W. M.	Saunders, Robert H.
Cooper, H. C.	Smith, Charles D.
	Wendt, Edmund C.

Please communicate with Dr. Linsly R. Williams, Director, The New York Academy of Medicine.

HOSACK BED FOR SICK AND NEEDY PHYSICIANS

Attention is directed to the following extract from the will of Mrs. Celine B. Hosack:

"I do give and bequeath unto my executors, hereinafter named, the sum of Ten Thousand Dollars, in trust, to apply and pay the same (or so much thereof as may be necessary) to The Roosevelt Hospital in the city of New York, to purchase a bed which, in memory of my husband, shall be known as the Hosack Bed, and which shall be occupied from time to time by such sick and needy physicians as may for that purpose be named or designated by the President and Treasurer for the time being of The New York Academy of Medicine."

DONATIONS TO THE LIBRARY FUNDS

Donations and bequests are solicited by The New York Academy of Medicine for the maintenance and expansion of the Library.

A donation or bequest of $5,000 or more will provide for a special library fund, the income of which may be used for the general purposes of the Library or restricted to the purchase of books and periodicals, as the donor or testator may indicate.

FORM OF BEQUESTS

The following is a brief legal form as a suggestion under which bequests may be made in behalf of the Academy:

I give, devise and bequeath unto "The New York Academy of Medicine" of the City of New York, State of New York, a corporation duly incorporated by the legislature of the State of New York by an act, entitled "An Act to Incorporate The New York Academy of Medicine," passed June 23, 1851, and amended June 4, 1853, June 2, 1877, and April 24, 1925.

1927

COMMITTEES OF THE ACADEMY

Committee on Admission

FREDERICK T. VAN BEUREN, JR., *Chairman*
GEORGE B. WALLACE
ARTHUR M. WRIGHT
SAMUEL BRADBURY
ALEXIS V. MOSCHCOWITZ
FREDERICK P. SOLLEY
ROLFE FLOYD
DEWITT STETTEN
HARBECK HALSTED

Committee on Library

CHARLES A. ELSBERG, *Chairman*
EUGENE F. DUBOIS
J. RAMSAY HUNT
RUSSELL L. CECIL
ERNEST G. STILLMAN

Committee on Public Health Relations

CHARLES L. DANA, *Chairman*

Executive Committee

ROBERT J. CARLISLE
JAMES B. CLEMENS
LEWIS F. FRISSELL
JOHN A. HARTWELL
JAMES ALEX. MILLER
BERNARD SACHS
FREDERIC E. SONDERN
GEO. DAVID STEWART
PHILIP VAN INGEN
GEORGE B. WALLACE
E. H. L. CORWIN, *Executive Secretary*

Committee on Medical Education

JAMES F. MCKERNON, *Chairman*

Executive Committee

HARLOW BROOKS
ARTHUR F. CHACE
CHARLES A. ELSBERG
NELLIS B. FOSTER
HOWARD FOX
JOHN E. JENNINGS
ARNOLD KNAPP
SAMUEL J. KOPETZKY
JOSEPH F. MCCARTHY
JOHN J. MOORHEAD
JOHN O. POLAK
CHARLES HENDEE SMITH
FREDERICK P. REYNOLDS, *Medical Secretary*

GRACE CARSTENSEN, *Executive Secretary*

House Committee

SAMUEL A. BROWN, *Chairman*
SETH M. MILLIKEN
ARTHUR B. DUEL
EUGENE H. POOL

Nominating Committee

J. BENTLEY SQUIER *Chairman*
W. W. HERRICK
FOSTER KENNEDY

Officers of Sections

Dermatology and Syphilis

EDWARD R. MALONEY, *Chairman*
JOSEPH J. ELLER, *Secretary*

Medicine

HENRY JAMES, *Chairman*
RALPH H. BOOTS, *Secretary*

Surgery

MORRIS K. SMITH, *Chairman*
EDWARD D. TRUESDELL, *Secretary*

Genito-Urinary Surgery

STANLEY R. WOODRUFF, *Chairman*
JOHN STURDIVANT READ, *Secretary*

Neurology and Psychiatry

WALTER M. KRAUS, *Chairman*
JUNIUS W. STEPHENSON, *Secretary*

Orthopedic Surgery

ARTHUR KRIDA, *Chairman*
ELMER P. WEIGEL, *Secretary*

Pediatrics

WILLIAM ROPES MAY, *Chairman*
STAFFORD MCLEAN, *Secretary*

Obstetrics and Gynecology

HERVEY C. WILLIAMSON, *Chairman*
THOMAS H. CHERRY, *Secretary*

Otology

RICHARD T. ATKINS, *Chairman*
CLARENCE H. SMITH, *Secretary*

Laryngology and Rhinology

ARTHUR NILSEN, *Chairman*
WESTLEY M. HUNT, *Secretary*

Ophthalmology

BERNARD SAMUELS, *Chairman*
THOMAS H. JOHNSON, *Secretary*

Historical and Cultural Medicine

BERNARD SACHS, *Chairman*
CHARLES E. ATWOOD, *Secretary*

TABLE OF CONTENTS

Editorial:

Early Medieval Anatomy: Fielding H. Garrison 607

The Wesley M. Carpenter Lecture:

The Future Food Supply of the United States: Alonzo E. Taylor 610

Section of Medicine, February 17, 1927:

Cardiac Asthma: Morris H. Kahn 632

Section of Neurology and Psychiatry, April 12, 1927:

The Myasthenic Syndrome: Charles A. McKendree 642

How Young Doctors Should Behave: Charles L. Dana 650

Library notes:

Recent Accessions 654

Announcement 658

In Memoriam, Dr. Thomas W. Salmon: Frankwood E. Williams 659

Obituary, Dr. Henry Koplik: Emanuel Libman 667

Death notices 671

Special notice 673